

ALMANAC

XXVI

SAROS SERIES OF LUNAR ECLIPSES

The almanac XXVI contains saros series of lunar eclipses
from saros series 1 to saros series 180.

SAROS SERIES

1

Saros series 1 contains 73 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-36	-2570 Mar 14	07:40:26	61380	-56522	Nb h-	-1.5386	0.0377	-0.9683	55.6	-	-		
02	-35	-2552 Mar 24	14:50:04	60877	-56299	N t-	-1.4793	0.1471	-0.8601	109.1	-	-		
03	-34	-2534 Apr 04	21:53:45	60376	-56076	N t-	-1.4157	0.2647	-0.7441	145.4	-	-		
04	-33	-2516 Apr 15	04:48:05	59876	-55853	N t-	-1.3454	0.3947	-0.6162	176.2	-	-		
05	-32	-2498 Apr 26	11:39:13	59379	-55630	N t-	-1.2732	0.5286	-0.4849	202.1	-	-		
06	-31	-2480 May 06	18:24:32	58884	-55407	N t-	-1.1973	0.6695	-0.3473	225.3	-	-		
07	-30	-2462 May 18	01:08:43	58391	-55184	N t-	-1.1211	0.8112	-0.2093	245.6	-	-		
08	-29	-2444 May 28	07:49:49	57900	-54961	N t-	-1.0430	0.9567	-0.0681	264.0	-	-		
09	-28	-2426 Jun 08	14:33:21	57411	-54738	P t-	-0.9675	1.0975	0.0680	279.8	61.5	-		
10	-27	-2408 Jun 18	21:17:40	56924	-54515	P t-	-0.8935	1.2359	0.2011	293.8	104.1	-		
11	-26	-2390 Jun 30	04:05:54	56440	-54292	P t-	-0.8234	1.3675	0.3271	305.9	130.7	-		
12	-25	-2372 Jul 10	10:58:36	55957	-54069	P t-	-0.7576	1.4912	0.4448	316.4	150.2	-		
13	-24	-2354 Jul 21	17:58:11	55476	-53846	P t-	-0.6983	1.6031	0.5507	325.2	164.8	-		

14	-23	-2336	Aug 01	01:04:49	54998	-53623	P	t-	-0.6450	1.7041	0.6454	332.7	176.1	-
15	-22	-2318	Aug 12	08:18:34	54521	-53400	P	t-	-0.5983	1.7929	0.7280	338.9	184.9	-
16	-21	-2300	Aug 22	15:41:05	54047	-53177	P	t-	-0.5595	1.8672	0.7961	344.1	191.6	-
17	-20	-2282	Sep 02	23:11:41	53575	-52954	P	t-	-0.5280	1.9279	0.8509	348.3	196.5	-
18	-19	-2264	Sep 13	06:50:07	53104	-52731	P	t-	-0.5036	1.9756	0.8930	351.7	200.2	-
19	-18	-2246	Sep 24	14:36:06	52636	-52508	P	t-	-0.4858	2.0107	0.9231	354.4	202.8	-
20	-17	-2228	Oct 04	22:29:01	52170	-52285	P	t-	-0.4741	2.0345	0.9423	356.4	204.5	-
21	-16	-2210	Oct 16	06:27:18	51706	-52062	P	t-	-0.4676	2.0484	0.9525	358.0	205.5	-
22	-15	-2192	Oct 26	14:28:28	51244	-51839	P	t-	-0.4639	2.0567	0.9578	359.1	206.2	-
23	-14	-2174	Nov 06	22:32:25	50784	-51616	P	t-	-0.4628	2.0598	0.9587	360.0	206.5	-
24	-13	-2156	Nov 17	06:36:42	50327	-51393	P	t-	-0.4621	2.0617	0.9593	360.7	206.8	-
25	-12	-2138	Nov 28	14:39:01	49871	-51170	P	t-	-0.4601	2.0655	0.9627	361.3	207.3	-
26	-11	-2120	Dec 08	22:37:38	49417	-50947	P	t-	-0.4553	2.0743	0.9717	361.9	208.1	-
27	-10	-2102	Dec 20	06:31:18	48966	-50724	P	t-	-0.4465	2.0899	0.9885	362.7	209.4	-
28	-09	-2084	Dec 30	14:18:53	48516	-50501	T	t-	-0.4326	2.1143	1.0147	363.7	211.3	20.0
29	-08	-2065	Jan 10	21:57:19	48069	-50278	T	t-	-0.4113	2.1522	1.0551	365.0	213.9	38.2
30	-07	-2047	Jan 21	05:28:00	47623	-50055	T	t-	-0.3835	2.2018	1.1075	366.5	217.0	52.5
31	-06	-2029	Feb 01	12:48:06	47180	-49832	T	p-	-0.3470	2.2671	1.1761	368.3	220.7	65.7
32	-05	-2011	Feb 11	19:59:28	46739	-49609	T	p-	-0.3033	2.3455	1.2581	370.1	224.4	77.3
33	-04	-1993	Feb 23	02:59:48	46300	-49386	T-	pp	-0.2503	2.4408	1.3571	371.8	228.2	87.7
34	-03	-1975	Mar 05	09:52:15	45863	-49163	T-	pp	-0.1908	2.5483	1.4683	373.3	231.5	96.0
35	-02	-1957	Mar 16	16:35:22	45427	-48940	T-	pp	-0.1234	2.6701	1.5937	374.2	234.1	102.2
36	-01	-1939	Mar 26	23:10:33	44995	-48717	T-	pp	-0.0493	2.8043	1.7314	374.5	235.6	105.8
37	00	-1921	Apr 07	05:39:20	44564	-48494	T+	pp	0.0302	2.8377	1.7681	373.9	235.6	106.2
38	01	-1903	Apr 17	12:03:29	44135	-48271	T+	pp	0.1136	2.6832	1.6165	372.2	234.0	103.0
39	02	-1885	Apr 28	18:24:44	43708	-48048	T+	pp	0.1999	2.5233	1.4594	369.4	230.5	95.4
40	03	-1867	May 09	00:43:26	43283	-47825	T	pp	0.2887	2.3594	1.2977	365.3	225.0	81.8
41	04	-1849	May 20	07:03:18	42861	-47602	T	-t	0.3769	2.1966	1.1368	360.0	217.3	58.5

42	05	-1831	May 30	13:24:50	42440	-47379	P	-t	0.4638	2.0363	0.9778	353.4	207.4	-
43	06	-1813	Jun 10	19:49:53	42022	-47156	P	-t	0.5485	1.8804	0.8230	345.8	195.3	-
44	07	-1795	Jun 21	02:19:43	41606	-46933	P	-t	0.6299	1.7308	0.6740	337.3	180.9	-
45	08	-1777	Jul 02	08:56:57	41191	-46710	P	-t	0.7058	1.5914	0.5349	328.2	164.5	-
46	09	-1759	Jul 12	15:42:26	40779	-46487	P	-t	0.7753	1.4639	0.4073	318.8	146.1	-
47	10	-1741	Jul 23	22:35:57	40369	-46264	P	-t	0.8388	1.3475	0.2907	309.2	125.3	-
48	11	-1723	Aug 03	05:40:26	39961	-46041	P	-t	0.8939	1.2467	0.1893	300.0	102.4	-
49	12	-1705	Aug 14	12:54:55	39555	-45818	P	-t	0.9414	1.1599	0.1019	291.4	75.8	-
50	13	-1687	Aug 24	20:21:14	39151	-45595	P	-t	0.9800	1.0893	0.0308	283.8	42.0	-
51	14	-1669	Sep 05	03:56:22	38749	-45372	Nx	-t	1.0119	1.0309	-0.0281	277.0	-	-
52	15	-1651	Sep 15	11:43:49	38349	-45149	N	-t	1.0345	0.9895	-0.0697	271.8	-	-
53	16	-1633	Sep 26	19:39:37	37952	-44926	N	-t	1.0510	0.9593	-0.1000	267.7	-	-
54	17	-1615	Oct 07	03:45:18	37556	-44703	N	-t	1.0604	0.9418	-0.1170	264.9	-	-
55	18	-1597	Oct 18	11:57:26	37162	-44480	N	-h	1.0653	0.9323	-0.1254	263.0	-	-
56	19	-1579	Oct 28	20:17:20	36771	-44257	N	-h	1.0650	0.9321	-0.1242	262.1	-	-
57	20	-1561	Nov 09	04:40:29	36381	-44034	N	-h	1.0627	0.9353	-0.1187	261.6	-	-
58	21	-1543	Nov 19	13:06:38	35994	-43811	N	-h	1.0589	0.9407	-0.1104	261.2	-	-
59	22	-1525	Nov 30	21:33:18	35609	-43588	N	-h	1.0556	0.9450	-0.1025	260.7	-	-
60	23	-1507	Dec 11	06:00:07	35226	-43365	N	-h	1.0534	0.9468	-0.0964	259.9	-	-
61	24	-1489	Dec 22	14:22:43	34844	-43142	N	-h	1.0553	0.9409	-0.0975	258.1	-	-
62	25	-1470	Jan 01	22:41:55	34465	-42919	N	-h	1.0608	0.9281	-0.1049	255.6	-	-
63	26	-1452	Jan 13	06:54:46	34088	-42696	N	-h	1.0723	0.9040	-0.1231	251.8	-	-
64	27	-1434	Jan 23	15:02:40	33713	-42473	N	-h	1.0887	0.8708	-0.1502	246.8	-	-
65	28	-1416	Feb 03	23:01:10	33341	-42250	N	-h	1.1136	0.8220	-0.1925	239.9	-	-
66	29	-1398	Feb 14	06:54:14	32970	-42027	N	-h	1.1436	0.7635	-0.2445	231.5	-	-
67	30	-1380	Feb 25	14:37:57	32601	-41804	N	-h	1.1819	0.6900	-0.3115	220.6	-	-
68	31	-1362	Mar 07	22:16:20	32234	-41581	N	-h	1.2252	0.6073	-0.3878	207.7	-	-
69	32	-1344	Mar 18	05:46:10	31870	-41358	N	-h	1.2763	0.5105	-0.4785	191.4	-	-

70	33	-1326	Mar 29	13:12:17	31507	-41135	N	-a	1.3311	0.4070	-0.5762	171.8	-	-
71	34	-1308	Apr 08	20:32:09	31147	-40912	N	-a	1.3916	0.2933	-0.6846	146.8	-	-
72	35	-1290	Apr 20	03:49:00	30789	-40689	N	-a	1.4553	0.1739	-0.7990	113.8	-	-
73	36	-1272	Apr 30	11:02:54	30432	-40466	Ne	-a	1.5218	0.0497	-0.9190	61.3	-	-

SAROS SERIES

2

Saros series 2 contains 73 lunar eclipses.

PHASE														
DURATIONS														
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-35	-2523	Mar 03	23:38:19	60073	-55941	Nb	t-	1.5459	0.0569	-1.0137	73.4	-	-
02	-34	-2505	Mar 15	06:22:01	59575	-55718	N	t-	1.4782	0.1786	-0.8871	128.3	-	-
03	-33	-2487	Mar 25	13:00:09	59079	-55495	N	t-	1.4052	0.3102	-0.7507	166.6	-	-
04	-32	-2469	Apr 05	19:32:43	58585	-55272	N	t-	1.3265	0.4524	-0.6040	197.9	-	-
05	-31	-2451	Apr 16	02:03:10	58094	-55049	N	t-	1.2451	0.5997	-0.4527	223.9	-	-

06	-30	-2433	Apr 27	08:29:45	57604	-54826	N	t-	1.1592	0.7554	-0.2932	246.6	-	-
07	-29	-2415	May 07	14:58:04	57116	-54603	N	t-	1.0735	0.9111	-0.1342	265.6	-	-
08	-28	-2397	May 18	21:26:07	56631	-54380	P	t-	0.9859	1.0704	0.0279	282.1	40.2	-
09	-27	-2379	May 29	03:59:05	56147	-54157	P	t-	0.9011	1.2247	0.1846	295.7	100.8	-
10	-26	-2361	Jun 09	10:34:37	55666	-53934	P	t-	0.8170	1.3780	0.3397	307.2	133.2	-
11	-25	-2343	Jun 19	17:18:38	55187	-53711	P	t-	0.7385	1.5215	0.4846	316.3	155.1	-
12	-24	-2325	Jul 01	00:08:44	54709	-53488	P	t-	0.6633	1.6589	0.6230	323.8	171.5	-
13	-23	-2307	Jul 11	07:08:34	54234	-53265	P	t-	0.5949	1.7840	0.7488	329.5	183.5	-
14	-22	-2289	Jul 22	14:17:03	53761	-53042	P	h-	0.5325	1.8984	0.8636	333.8	192.6	-
15	-21	-2271	Aug 01	21:37:01	53290	-52819	P	h-	0.4785	1.9975	0.9628	336.8	199.0	-
16	-20	-2253	Aug 13	05:07:04	52821	-52596	T	a-	0.4315	2.0837	1.0489	338.9	203.8	34.7
17	-19	-2235	Aug 23	12:47:32	52354	-52373	T	a-	0.3921	2.1560	1.1213	340.2	207.1	53.2
18	-18	-2217	Sep 03	20:38:59	51889	-52150	T	a-	0.3608	2.2134	1.1787	340.9	209.2	63.1
19	-17	-2199	Sep 14	04:40:30	51426	-51927	T	a-	0.3370	2.2570	1.2225	340.9	210.5	69.2
20	-16	-2181	Sep 25	12:51:34	50966	-51704	T	p-	0.3202	2.2876	1.2536	340.6	211.2	72.9
21	-15	-2163	Oct 05	21:10:18	50507	-51481	T	p-	0.3090	2.3077	1.2745	340.0	211.4	75.0
22	-14	-2145	Oct 17	05:36:34	50050	-51258	T	p-	0.3030	2.3181	1.2863	339.0	211.2	76.1
23	-13	-2127	Oct 27	14:07:53	49596	-51035	T	p-	0.3003	2.3220	1.2921	337.9	210.8	76.5
24	-12	-2109	Nov 07	22:42:33	49144	-50812	T	p-	0.2997	2.3219	1.2945	336.7	210.3	76.5
25	-11	-2091	Nov 18	07:19:17	48693	-50589	T	p-	0.3000	2.3198	1.2955	335.3	209.8	76.5
26	-10	-2073	Nov 29	15:56:15	48245	-50366	T	p-	0.2999	2.3180	1.2974	334.0	209.3	76.5
27	-09	-2055	Dec 10	00:31:10	47799	-50143	T	p-	0.2973	2.3206	1.3044	332.7	209.0	77.1
28	-08	-2037	Dec 21	09:02:20	47355	-49920	T	p-	0.2908	2.3303	1.3187	331.5	209.0	78.3
29	-07	-2019	Dec 31	17:29:07	46913	-49697	T	p-	0.2800	2.3473	1.3411	330.4	209.3	80.2
30	-06	-2000	Jan 12	01:50:23	46473	-49474	T+	p-	0.2642	2.3734	1.3728	329.5	209.8	82.8
31	-05	-1982	Jan 22	10:03:40	46035	-49251	T+	p-	0.2411	2.4129	1.4182	328.9	210.7	86.1
32	-04	-1964	Feb 02	18:10:18	45599	-49028	T+	p-	0.2119	2.4635	1.4746	328.3	211.8	89.6
33	-03	-1946	Feb 13	02:08:34	45165	-48805	T+	p-	0.1751	2.5281	1.5452	327.8	212.9	93.2

34	-02	-1928	Feb 24	10:00:35	44733	-48582	T+	p-	0.1325	2.6032	1.6262	327.2	213.9	96.3
35	-01	-1910	Mar 06	17:43:30	44304	-48359	T+	pp	0.0818	2.6934	1.7220	326.6	214.7	98.8
36	00	-1892	Mar 17	01:21:33	43876	-48136	T+	pp	0.0264	2.7925	1.8262	325.7	214.9	100.2
37	01	-1874	Mar 28	08:52:26	43451	-47913	T-	pp	-0.0358	2.7728	1.8114	324.4	214.5	100.0
38	02	-1856	Apr 07	16:19:37	43027	-47690	T-	pp	-0.1016	2.6498	1.6927	322.6	213.2	98.0
39	03	-1838	Apr 18	23:42:07	42606	-47467	T-	pp	-0.1721	2.5186	1.5653	320.3	210.9	93.5
40	04	-1820	Apr 29	07:03:25	42187	-47244	T-	-p	-0.2443	2.3847	1.4344	317.3	207.4	86.3
41	05	-1802	May 10	14:23:15	41770	-47021	T	-p	-0.3182	2.2477	1.2998	313.6	202.7	75.1
42	06	-1784	May 20	21:43:09	41355	-46798	T	-a	-0.3928	2.1101	1.1640	309.2	196.7	58.0
43	07	-1766	Jun 01	05:04:33	40941	-46575	T	-a	-0.4665	1.9742	1.0292	304.2	189.4	25.4
44	08	-1748	Jun 11	12:28:41	40531	-46352	P	-a	-0.5386	1.8419	0.8971	298.6	180.8	-
45	09	-1730	Jun 22	19:56:47	40122	-46129	P	-a	-0.6074	1.7156	0.7706	292.6	171.0	-
46	10	-1712	Jul 03	03:29:16	39715	-45906	P	-a	-0.6729	1.5960	0.6501	286.2	160.0	-
47	11	-1694	Jul 14	11:08:16	39310	-45683	P	-a	-0.7332	1.4861	0.5386	279.8	148.1	-
48	12	-1676	Jul 24	18:54:02	38907	-45460	P	-a	-0.7882	1.3861	0.4366	273.3	135.3	-
49	13	-1658	Aug 05	02:46:59	38507	-45237	P	-a	-0.8374	1.2971	0.3453	267.2	121.9	-
50	14	-1640	Aug 15	10:48:01	38108	-45014	P	-a	-0.8800	1.2204	0.2658	261.5	108.2	-
51	15	-1622	Aug 26	18:57:15	37712	-44791	P	-a	-0.9158	1.1560	0.1985	256.5	94.4	-
52	16	-1604	Sep 06	03:15:18	37317	-44568	P	-a	-0.9448	1.1045	0.1439	252.3	81.0	-
53	17	-1586	Sep 17	11:40:02	36925	-44345	P	-a	-0.9685	1.0625	0.0989	248.8	67.5	-
54	18	-1568	Sep 27	20:13:36	36535	-44122	P	-a	-0.9850	1.0336	0.0670	246.4	55.9	-
55	19	-1550	Oct 09	04:53:04	36147	-43899	P	-a	-0.9969	1.0132	0.0439	244.8	45.4	-
56	20	-1532	Oct 19	13:39:15	35761	-43676	P	-a	-1.0035	1.0023	0.0306	244.0	38.0	-
57	21	-1514	Oct 30	22:28:20	35377	-43453	P	-a	-1.0078	0.9954	0.0216	243.6	32.0	-
58	22	-1496	Nov 10	07:21:16	34994	-43230	P	-a	-1.0091	0.9938	0.0185	243.8	29.6	-
59	23	-1478	Nov 21	16:14:29	34615	-43007	P	-a	-1.0103	0.9923	0.0158	244.0	27.4	-
60	24	-1460	Dec 02	01:07:16	34237	-42784	P	-a	-1.0115	0.9904	0.0132	244.1	25.1	-
61	25	-1442	Dec 13	09:57:08	33861	-42561	P	-a	-1.0151	0.9840	0.0065	243.8	17.7	-

62	26	-1424	Dec 23	18:43:33	33487	-42338	N	-a	-1.0210	0.9730	-0.0043	243.1	-	-
63	27	-1405	Jan 04	03:23:38	33116	-42115	N	-a	-1.0321	0.9525	-0.0243	241.4	-	-
64	28	-1387	Jan 14	11:56:56	32746	-41892	N	-a	-1.0484	0.9221	-0.0539	238.6	-	-
65	29	-1369	Jan 25	20:22:14	32379	-41669	N	-a	-1.0708	0.8805	-0.0946	234.6	-	-
66	30	-1351	Feb 05	04:39:43	32013	-41446	N	-a	-1.0991	0.8282	-0.1459	229.2	-	-
67	31	-1333	Feb 16	12:46:45	31650	-41223	N	-a	-1.1356	0.7607	-0.2125	221.6	-	-
68	32	-1315	Feb 26	20:45:40	31289	-41000	N	-a	-1.1782	0.6820	-0.2904	212.0	-	-
69	33	-1297	Mar 10	04:34:42	30930	-40777	N	-a	-1.2286	0.5894	-0.3825	199.4	-	-
70	34	-1279	Mar 20	12:16:37	30573	-40554	N	-a	-1.2840	0.4876	-0.4842	183.6	-	-
71	35	-1261	Mar 31	19:48:00	30218	-40331	N	-a	-1.3474	0.3715	-0.6006	162.5	-	-
72	36	-1243	Apr 11	03:14:07	29865	-40108	N	-a	-1.4142	0.2492	-0.7236	135.1	-	-
73	37	-1225	Apr 22	10:32:15	29514	-39885	Ne	-a	-1.4869	0.1166	-0.8577	93.8	-	-

SAROS SERIES

3

Saros series 3 contains 76 lunar eclipses.

PHASE

DURATIONS

SEQ. REL. CALENDAR TD ΔT LUNA ECL. QSE GAMMA PEN. UM. PEN. PAR. TOTAL

NUM.	NUM.	DATE	OF	s	NUM	TYPE	MAG.	MAG.	m	m	m	
GREATEST												
ECLIPSE												
01	-41	-2567 Dec 30	13:47:17	61274 -56475	N	a-	-1.5469	0.0115	-0.9727	29.4	-	-
02	-40	-2548 Jan 10	22:13:11	60771 -56252	N	a-	-1.5279	0.0440	-0.9353	57.0	-	-
03	-39	-2530 Jan 21	06:30:04	60270 -56029	N	a-	-1.5012	0.0904	-0.8839	81.2	-	-
04	-38	-2512 Feb 01	14:41:00	59771 -55806	N	a-	-1.4695	0.1460	-0.8232	102.3	-	-
05	-37	-2494 Feb 11	22:43:03	59275 -55583	N	a-	-1.4301	0.2158	-0.7484	123.3	-	-
06	-36	-2476 Feb 23	06:37:19	58780 -55360	N	a-	-1.3841	0.2978	-0.6616	143.3	-	-
07	-35	-2458 Mar 05	14:23:51	58287 -55137	N	a-	-1.3315	0.3920	-0.5630	162.6	-	-
08	-34	-2440 Mar 15	22:04:16	57797 -54914	N	a-	-1.2736	0.4962	-0.4547	180.7	-	-
09	-33	-2422 Mar 27	05:38:32	57308 -54691	N	a-	-1.2103	0.6105	-0.3368	197.8	-	-
10	-32	-2404 Apr 06	13:07:52	56822 -54468	N	a-	-1.1424	0.7337	-0.2107	213.8	-	-
11	-31	-2386 Apr 17	20:33:46	56338 -54245	N	a-	-1.0713	0.8630	-0.0791	228.5	-	-
12	-30	-2368 Apr 28	03:57:40	55856 -54022	P	a-	-0.9982	0.9963	0.0559	241.8	51.2	-
13	-29	-2350 May 09	11:19:14	55375 -53799	P	a-	-0.9229	1.1340	0.1945	253.9	93.6	-
14	-28	-2332 May 19	18:41:43	54897 -53576	P	a-	-0.8479	1.2715	0.3323	264.6	119.9	-
15	-27	-2314 May 31	02:04:55	54421 -53353	P	a-	-0.7736	1.4080	0.4683	274.1	139.5	-
16	-26	-2296 Jun 10	09:31:51	53947 -53130	P	a-	-0.7021	1.5398	0.5989	282.2	154.6	-
17	-25	-2278 Jun 21	17:00:53	53476 -52907	P	a-	-0.6325	1.6684	0.7257	289.3	166.7	-
18	-24	-2260 Jul 02	00:36:24	53006 -52684	P	a-	-0.5686	1.7870	0.8419	295.1	176.2	-
19	-23	-2242 Jul 13	08:16:46	52538 -52461	P	a-	-0.5091	1.8976	0.9495	300.1	183.7	-
20	-22	-2224 Jul 23	16:04:39	52072 -52238	T	a-	-0.4560	1.9967	1.0452	304.2	189.5	31.3
21	-21	-2206 Aug 03	23:58:28	51609 -52015	T	p-	-0.4083	2.0862	1.1308	307.7	194.1	52.0
22	-20	-2188 Aug 14	08:01:22	51147 -51792	T	p-	-0.3686	2.1611	1.2017	310.5	197.5	63.1
23	-19	-2170 Aug 25	16:11:26	50688 -51569	T	p-	-0.3355	2.2241	1.2604	312.9	200.0	70.4
24	-18	-2152 Sep 05	00:29:28	50230 -51346	T	p-	-0.3094	2.2740	1.3061	314.8	201.9	75.1
25	-17	-2134 Sep 16	08:55:10	49775 -51123	T	p-	-0.2901	2.3117	1.3395	316.4	203.3	78.2

26	-16	-2116	Sep 26	17:28:25	49322	-50900	T	p-	-0.2772	2.3373	1.3611	317.8	204.2	80.1
27	-15	-2098	Oct 08	02:07:47	48871	-50677	T-	p-	-0.2700	2.3524	1.3724	318.9	204.8	81.1
28	-14	-2080	Oct 18	10:51:08	48422	-50454	T-	p-	-0.2665	2.3606	1.3773	319.9	205.3	81.5
29	-13	-2062	Oct 29	19:38:44	47975	-50231	T-	p-	-0.2670	2.3612	1.3749	320.8	205.5	81.4
30	-12	-2044	Nov 09	04:28:03	47530	-50008	T-	p-	-0.2690	2.3586	1.3699	321.6	205.7	81.1
31	-11	-2026	Nov 20	13:17:31	47087	-49785	T-	p-	-0.2717	2.3546	1.3640	322.3	205.9	80.8
32	-10	-2008	Nov 30	22:04:57	46646	-49562	T	p-	-0.2731	2.3529	1.3608	323.1	206.2	80.7
33	-09	-1990	Dec 12	06:49:16	46207	-49339	T-	p-	-0.2724	2.3547	1.3616	323.9	206.7	80.9
34	-08	-1972	Dec 22	15:28:24	45771	-49116	T-	p-	-0.2679	2.3631	1.3695	324.9	207.4	81.7
35	-07	-1953	Jan 03	00:00:33	45336	-48893	T-	p-	-0.2583	2.3808	1.3870	326.1	208.5	83.3
36	-06	-1935	Jan 13	08:25:06	44904	-48670	T-	p-	-0.2430	2.4090	1.4153	327.5	209.9	85.6
37	-05	-1917	Jan 24	16:41:03	44473	-48447	T-	p-	-0.2209	2.4493	1.4557	329.1	211.6	88.5
38	-04	-1899	Feb 04	00:46:57	44045	-48224	T-	p-	-0.1913	2.5035	1.5102	330.9	213.5	91.9
39	-03	-1881	Feb 15	08:43:08	43618	-48001	T-	pp	-0.1543	2.5713	1.5782	332.8	215.6	95.3
40	-02	-1863	Feb 25	16:29:24	43194	-47778	T-	pp	-0.1098	2.6529	1.6599	334.6	217.5	98.4
41	-01	-1845	Mar 09	00:06:45	42772	-47555	T-	pp	-0.0584	2.7475	1.7542	336.4	219.1	100.8
42	00	-1827	Mar 19	07:33:04	42352	-47332	T+	pp	0.0014	2.8523	1.8585	337.8	220.2	101.9
43	01	-1809	Mar 30	14:52:26	41934	-47109	T+	pp	0.0662	2.7340	1.7391	338.8	220.5	101.2
44	02	-1791	Apr 09	22:02:55	41518	-46886	T+	pp	0.1373	2.6041	1.6078	339.1	219.6	98.0
45	03	-1773	Apr 21	05:08:26	41104	-46663	T+	p	0.2119	2.4683	1.4700	338.7	217.5	91.6
46	04	-1755	May 01	12:06:30	40692	-46440	T	-a	0.2916	2.3232	1.3224	337.3	213.7	80.5
47	05	-1737	May 12	19:02:34	40283	-46217	T	-a	0.3720	2.1773	1.1734	334.9	208.2	62.3
48	06	-1719	May 23	01:54:21	39875	-45994	T	-a	0.4546	2.0277	1.0201	331.5	200.6	22.3
49	07	-1701	Jun 03	08:45:28	39469	-45771	P	-h	0.5364	1.8796	0.8678	327.0	190.8	-
50	08	-1683	Jun 13	15:35:47	39066	-45548	P	-h	0.6178	1.7327	0.7160	321.5	178.5	-
51	09	-1665	Jun 24	22:28:52	38665	-45325	P	-h	0.6954	1.5929	0.5710	315.1	163.8	-
52	10	-1647	Jul 05	05:24:22	38265	-45102	P	-h	0.7699	1.4592	0.4316	307.9	146.0	-
53	11	-1629	Jul 16	12:24:08	37868	-44879	P	-h	0.8394	1.3346	0.3010	300.2	124.8	-

54	12	-1611	Jul 26	19:29:34	37473	-44656	P	-h	0.9030	1.2211	0.1812	292.2	98.8	-
55	13	-1593	Aug 07	02:41:53	37080	-44433	P	-h	0.9597	1.1204	0.0740	284.3	64.3	-
56	14	-1575	Aug 17	10:01:01	36689	-44210	Nx	-h	1.0099	1.0315	-0.0215	276.7	-	-
57	15	-1557	Aug 28	17:28:02	36300	-43987	N	-h	1.0527	0.9563	-0.1032	269.7	-	-
58	16	-1539	Sep 08	01:03:10	35913	-43764	N	-h	1.0880	0.8947	-0.1710	263.7	-	-
59	17	-1521	Sep 19	08:46:32	35528	-43541	N	-h	1.1156	0.8470	-0.2246	258.9	-	-
60	18	-1503	Sep 29	16:36:00	35145	-43318	N	-h	1.1375	0.8097	-0.2675	255.0	-	-
61	19	-1485	Oct 11	00:33:19	34764	-43095	N	-h	1.1523	0.7849	-0.2973	252.6	-	-
62	20	-1467	Oct 21	08:35:15	34386	-42872	N	-h	1.1629	0.7677	-0.3188	251.1	-	-
63	21	-1449	Nov 01	16:41:48	34009	-42649	N	-t	1.1690	0.7584	-0.3317	250.5	-	-
64	22	-1431	Nov 12	00:48:37	33635	-42426	N	-t	1.1741	0.7505	-0.3425	250.0	-	-
65	23	-1413	Nov 23	08:57:24	33262	-42203	N	-t	1.1770	0.7461	-0.3489	250.0	-	-
66	24	-1395	Dec 03	17:03:38	32892	-41980	N	-t	1.1817	0.7382	-0.3580	249.4	-	-
67	25	-1377	Dec 15	01:06:57	32524	-41757	N	-t	1.1880	0.7268	-0.3698	248.1	-	-
68	26	-1359	Dec 25	09:04:12	32157	-41534	N	-t	1.1988	0.7069	-0.3894	245.5	-	-
69	27	-1340	Jan 05	16:55:33	31793	-41311	N	-t	1.2138	0.6788	-0.4165	241.5	-	-
70	28	-1322	Jan 16	00:38:28	31431	-41088	N	-t	1.2351	0.6388	-0.4548	235.4	-	-
71	29	-1304	Jan 27	08:12:26	31071	-40865	N	-t	1.2633	0.5860	-0.5056	226.7	-	-
72	30	-1286	Feb 06	15:36:47	30713	-40642	N	-t	1.2990	0.5194	-0.5698	214.9	-	-
73	31	-1268	Feb 17	22:51:28	30357	-40419	N	-t	1.3419	0.4393	-0.6471	199.1	-	-
74	32	-1250	Feb 28	05:55:40	30004	-40196	N	-t	1.3927	0.3445	-0.7390	177.9	-	-
75	33	-1232	Mar 10	12:50:32	29652	-39973	N	-t	1.4505	0.2370	-0.8436	149.0	-	-
76	34	-1214	Mar 21	19:36:06	29302	-39750	N	-t	1.5151	0.1170	-0.9608	105.7	-	-

SAROS SERIES

4

Saros series 4 contains 78 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-40	-2646 Oct 06	22:54:36	63509 -57455	N	a-	1.5549	0.0040	-0.9945	17.6	-	-		
02	-39	-2628 Oct 17	07:33:31	62997 -57232	N	a-	1.5562	0.0038	-0.9988	17.2	-	-		
03	-38	-2483 Jan 12	03:56:22	58975 -55448	N	a-	1.5575	0.0085	-1.0082	26.3	-	-		
04	-37	-2465 Jan 23	11:59:53	58482 -55225	N	a-	1.5388	0.0429	-0.9739	59.1	-	-		
05	-36	-2447 Feb 02	19:51:06	57990 -55002	N	h-	1.5114	0.0931	-0.9237	87.0	-	-		
06	-35	-2429 Feb 14	03:33:45	57501 -54779	N	h-	1.4781	0.1541	-0.8627	111.7	-	-		
07	-34	-2411 Feb 24	11:04:20	57014 -54556	N	h-	1.4365	0.2308	-0.7864	136.2	-	-		
08	-33	-2393 Mar 07	18:25:40	56529 -54333	N	t-	1.3880	0.3198	-0.6977	159.6	-	-		
09	-32	-2375 Mar 18	01:36:20	56046 -54110	N	t-	1.3318	0.4234	-0.5950	182.6	-	-		
10	-31	-2357 Mar 29	08:39:32	55565 -53887	N	t-	1.2703	0.5369	-0.4826	204.2	-	-		
11	-30	-2339 Apr 08	15:34:40	55086 -53664	N	t-	1.2030	0.6612	-0.3600	224.7	-	-		
12	-29	-2321 Apr 19	22:22:57	54609 -53441	N	t-	1.1309	0.7945	-0.2287	244.1	-	-		
13	-28	-2303 Apr 30	05:06:09	54134 -53218	N	t-	1.0552	0.9347	-0.0912	262.0	-	-		

14 -27 -2285 May 11 11:45:42 53661 -52995 P t- 0.9771 1.0797 0.0507 278.5 53.3 -

15 -26 -2267 May 21 18:22:50 53191 -52772 P t- 0.8976 1.2273 0.1947 293.4 102.7 -

16 -25 -2249 Jun 02 00:59:10 52722 -52549 P t- 0.8182 1.3751 0.3383 306.7 132.9 -

17 -24 -2231 Jun 12 07:36:42 52256 -52326 P t- 0.7404 1.5203 0.4789 318.5 155.3 -

18 -23 -2213 Jun 23 14:17:03 51791 -52103 P t- 0.6654 1.6603 0.6140 328.7 172.5 -

19 -22 -2195 Jul 03 21:00:24 51329 -51880 P t- 0.5935 1.7951 0.7434 337.5 186.3 -

20 -21 -2177 Jul 15 03:49:38 50869 -51657 P t- 0.5269 1.9200 0.8627 345.0 197.0 -

21 -20 -2159 Jul 25 10:44:52 50411 -51434 P t- 0.4659 2.0349 0.9718 351.2 205.4 -

22 -19 -2141 Aug 05 17:48:10 49955 -51211 T t- 0.4119 2.1370 1.0681 356.4 211.9 41.9

23 -18 -2123 Aug 16 00:58:25 49500 -50988 T p- 0.3640 2.2278 1.1530 360.7 216.9 61.1

24 -17 -2105 Aug 27 08:18:18 49048 -50765 T p- 0.3243 2.3035 1.2231 364.2 220.6 72.1

25 -16 -2087 Sep 06 15:46:16 48599 -50542 T p- 0.2914 2.3665 1.2807 367.0 223.3 79.2

26 -15 -2069 Sep 17 23:22:53 48151 -50319 T+ p- 0.2662 2.4152 1.3245 369.3 225.3 83.9

27 -14 -2051 Sep 28 07:06:59 47705 -50096 T+ pp 0.2473 2.4521 1.3569 371.1 226.7 86.9

28 -13 -2033 Oct 09 14:58:09 47261 -49873 T+ pp 0.2345 2.4775 1.3786 372.5 227.6 88.7

29 -12 -2015 Oct 19 22:54:47 46820 -49650 T+ pp 0.2263 2.4942 1.3921 373.6 228.2 89.8

30 -11 -1997 Oct 31 06:54:09 46380 -49427 T+ pp 0.2207 2.5057 1.4014 374.4 228.7 90.6

31 -10 -1979 Nov 10 14:56:40 45943 -49204 T+ pp 0.2178 2.5117 1.4059 375.0 229.0 91.0

32 -09 -1961 Nov 21 22:58:46 45507 -48981 T+ pp 0.2154 2.5164 1.4101 375.4 229.3 91.3

33 -08 -1943 Dec 02 06:59:23 45074 -48758 T+ pp 0.2115 2.5233 1.4173 375.7 229.6 91.9

34 -07 -1925 Dec 13 14:55:19 44643 -48535 T+ pp 0.2042 2.5363 1.4313 376.0 230.1 93.0

35 -06 -1907 Dec 23 22:47:02 44214 -48312 T+ pp 0.1935 2.5549 1.4519 376.1 230.8 94.4

36 -05 -1888 Jan 04 06:31:35 43786 -48089 T+ pp 0.1771 2.5837 1.4832 376.3 231.6 96.4

37 -04 -1870 Jan 14 14:08:08 43361 -47866 T+ pp 0.1543 2.6239 1.5265 376.5 232.6 98.7

38 -03 -1852 Jan 25 21:35:43 42938 -47643 T+ pp 0.1243 2.6772 1.5835 376.6 233.7 101.3

39 -02 -1834 Feb 05 04:54:28 42518 -47420 T+ pp 0.0867 2.7440 1.6543 376.5 234.7 103.6

40 -01 -1816 Feb 16 12:03:43 42099 -47197 T+ pp 0.0413 2.8253 1.7399 376.2 235.4 105.4

41 00 -1798 Feb 26 19:03:40 41682 -46974 T- pp -0.0120 2.8769 1.7958 375.5 235.5 105.9

42	01	-1780	Mar 09	01:55:13	41267	-46751	T-	pp	-0.0724	2.7637	1.6871	374.2	234.8	104.7
43	02	-1762	Mar 20	08:39:14	40855	-46528	T-	pp	-0.1392	2.6391	1.5666	372.2	232.9	100.9
44	03	-1744	Mar 30	15:15:32	40444	-46305	T-	pp	-0.2128	2.5020	1.4337	369.3	229.6	93.5
45	04	-1726	Apr 10	21:47:07	40036	-46082	T	pp	-0.2905	2.3573	1.2929	365.3	224.6	81.1
46	05	-1708	Apr 21	04:13:56	39629	-45859	T	-t	-0.3727	2.2048	1.1439	360.0	217.5	59.8
47	06	-1690	May 02	10:39:50	39225	-45636	P	-t	-0.4559	2.0505	0.9928	353.6	208.2	-
48	07	-1672	May 12	17:02:20	38823	-45413	P	-t	-0.5422	1.8907	0.8358	345.8	196.2	-
49	08	-1654	May 23	23:27:40	38423	-45190	P	-t	-0.6268	1.7344	0.6818	336.8	181.6	-
50	09	-1636	Jun 03	05:53:38	38024	-44967	P	-t	-0.7114	1.5781	0.5274	326.5	163.4	-
51	10	-1618	Jun 14	12:25:23	37629	-44744	P	-t	-0.7918	1.4299	0.3807	315.3	141.6	-
52	11	-1600	Jun 24	19:00:47	37235	-44521	P	-t	-0.8697	1.2865	0.2383	303.1	114.2	-
53	12	-1582	Jul 06	01:45:30	36843	-44298	P	-t	-0.9408	1.1556	0.1081	290.5	78.1	-
54	13	-1564	Jul 16	08:37:25	36453	-44075	Nx	-t	-1.0068	1.0343	-0.0129	277.6	-	-
55	14	-1546	Jul 27	15:39:19	36065	-43852	N	-t	-1.0657	0.9262	-0.1209	264.9	-	-
56	15	-1528	Aug 06	22:50:26	35679	-43629	N	-t	-1.1178	0.8306	-0.2166	252.6	-	-
57	16	-1510	Aug 18	06:13:29	35296	-43406	N	-t	-1.1611	0.7513	-0.2962	241.4	-	-
58	17	-1492	Aug 28	13:46:42	34914	-43183	N	-t	-1.1973	0.6851	-0.3626	231.4	-	-
59	18	-1474	Sep 08	21:30:45	34535	-42960	N	-t	-1.2256	0.6332	-0.4147	222.9	-	-
60	19	-1456	Sep 19	05:24:57	34157	-42737	N	-h	-1.2467	0.5944	-0.4534	216.1	-	-
61	20	-1438	Sep 30	13:29:26	33782	-42514	N	-h	-1.2604	0.5690	-0.4784	211.3	-	-
62	21	-1420	Oct 10	21:41:35	33409	-42291	N	-h	-1.2687	0.5535	-0.4932	208.0	-	-
63	22	-1402	Oct 22	06:01:18	33038	-42068	N	-h	-1.2717	0.5474	-0.4980	206.3	-	-
64	23	-1384	Nov 01	14:26:06	32669	-41845	N	-h	-1.2714	0.5469	-0.4967	205.5	-	-
65	24	-1366	Nov 12	22:55:36	32302	-41622	N	-a	-1.2682	0.5517	-0.4895	205.6	-	-
66	25	-1348	Nov 23	07:25:41	31937	-41399	N	-a	-1.2652	0.5556	-0.4826	205.5	-	-
67	26	-1330	Dec 04	15:57:40	31574	-41176	N	-a	-1.2615	0.5606	-0.4738	205.5	-	-
68	27	-1312	Dec 15	00:27:24	31213	-40953	N	-a	-1.2599	0.5614	-0.4688	204.8	-	-
69	28	-1294	Dec 26	08:54:36	30854	-40730	N	-a	-1.2614	0.5561	-0.4692	203.1	-	-

											PHASE		
											DURATIONS		
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													

01	-38	-2455	Dec 22	12:44:08	58184	-55090	N	t-	-1.5786	0.0109	-1.0874	32.7	-	-
02	-37	-2436	Jan 02	20:26:57	57694	-54867	N	t-	-1.5597	0.0435	-1.0507	64.8	-	-
03	-36	-2418	Jan 13	04:03:30	57206	-54644	N	t-	-1.5353	0.0859	-1.0037	90.6	-	-
04	-35	-2400	Jan 24	11:30:28	56720	-54421	N	t-	-1.5025	0.1435	-0.9410	116.2	-	-
05	-34	-2382	Feb 03	18:50:33	56236	-54198	N	t-	-1.4635	0.2125	-0.8666	140.1	-	-
06	-33	-2364	Feb 15	01:59:32	55754	-53975	N	t-	-1.4145	0.2995	-0.7740	164.5	-	-
07	-32	-2346	Feb 25	09:02:38	55274	-53752	N	t-	-1.3597	0.3971	-0.6708	187.0	-	-
08	-31	-2328	Mar 07	15:56:03	54797	-53529	N	t-	-1.2962	0.5109	-0.5515	209.1	-	-
09	-30	-2310	Mar 18	22:44:38	54321	-53306	N	t-	-1.2277	0.6339	-0.4230	229.4	-	-
10	-29	-2292	Mar 29	05:25:36	53848	-53083	N	t-	-1.1517	0.7708	-0.2809	248.6	-	-
11	-28	-2274	Apr 09	12:04:37	53376	-52860	N	t-	-1.0729	0.9128	-0.1340	265.6	-	-
12	-27	-2256	Apr 19	18:39:13	52907	-52637	P	t-	-0.9893	1.0640	0.0216	281.1	35.4	-
13	-26	-2238	May 01	01:12:56	52440	-52414	P	t-	-0.9036	1.2191	0.1809	294.7	99.7	-
14	-25	-2220	May 11	07:46:30	51974	-52191	P	t-	-0.8168	1.3767	0.3419	306.4	133.4	-
15	-24	-2202	May 22	14:22:31	51511	-51968	P	t-	-0.7309	1.5327	0.5010	316.2	157.1	-
16	-23	-2184	Jun 01	21:02:03	51050	-51745	P	t-	-0.6465	1.6863	0.6572	324.3	174.9	-
17	-22	-2166	Jun 13	03:45:58	50591	-51522	P	t-	-0.5646	1.8356	0.8086	330.7	188.5	-
18	-21	-2148	Jun 23	10:37:15	50134	-51299	P	t-	-0.4876	1.9761	0.9507	335.6	198.6	-
19	-20	-2130	Jul 04	17:35:59	49679	-51076	T	h-	-0.4158	2.1073	1.0831	339.2	206.1	44.8
20	-19	-2112	Jul 15	00:43:13	49227	-50853	T	a-	-0.3499	2.2278	1.2044	341.7	211.5	67.4
21	-18	-2094	Jul 26	07:59:58	48776	-50630	T	p-	-0.2907	2.3362	1.3133	343.2	215.2	80.0
22	-17	-2076	Aug 05	15:27:39	48327	-50407	T-	p-	-0.2394	2.4302	1.4075	344.0	217.6	87.8
23	-16	-2058	Aug 16	23:06:02	47881	-50184	T-	p-	-0.1962	2.5094	1.4868	344.1	219.0	92.7
24	-15	-2040	Aug 27	06:54:28	47436	-49961	T-	p-	-0.1603	2.5751	1.5526	343.9	219.7	95.7
25	-14	-2022	Sep 07	14:53:54	46994	-49738	T-	p-	-0.1327	2.6257	1.6033	343.3	219.9	97.4
26	-13	-2004	Sep 17	23:03:26	46553	-49515	T-	p-	-0.1126	2.6626	1.6404	342.6	219.7	98.3
27	-12	-1986	Sep 29	07:21:46	46115	-49292	T-	p-	-0.0990	2.6872	1.6656	341.6	219.4	98.8
28	-11	-1968	Oct 09	15:47:22	45679	-49069	T-	p-	-0.0907	2.7019	1.6812	340.6	218.9	98.9

29	-10	-1950	Oct 21	00:19:31	45245	-48846	T-	p-	-0.0873	2.7076	1.6883	339.5	218.4	98.8
30	-09	-1932	Oct 31	08:56:42	44813	-48623	T-	p-	-0.0872	2.7067	1.6892	338.3	217.8	98.6
31	-08	-1914	Nov 11	17:35:59	44383	-48400	T-	p-	-0.0882	2.7036	1.6887	337.1	217.2	98.4
32	-07	-1896	Nov 22	02:17:20	43955	-48177	T-	p-	-0.0902	2.6984	1.6864	335.8	216.7	98.2
33	-06	-1878	Dec 03	10:57:29	43529	-47954	T-	p-	-0.0903	2.6964	1.6881	334.5	216.2	98.1
34	-05	-1860	Dec 13	19:36:06	43105	-47731	T-	p-	-0.0887	2.6973	1.6930	333.3	215.8	98.1
35	-04	-1842	Dec 25	04:09:24	42683	-47508	T-	p-	-0.0818	2.7076	1.7080	332.0	215.5	98.3
36	-03	-1823	Jan 04	12:39:16	42264	-47285	T-	p-	-0.0714	2.7242	1.7296	330.8	215.3	98.7
37	-02	-1805	Jan 15	21:02:10	41846	-47062	T-	pp	-0.0540	2.7535	1.7642	329.6	215.1	99.2
38	-01	-1787	Jan 26	05:18:27	41431	-46839	T-	pp	-0.0306	2.7937	1.8099	328.4	215.0	99.6
39	00	-1769	Feb 06	13:26:34	41017	-46616	T+	pp	0.0004	2.8463	1.8680	327.1	214.7	99.8
40	01	-1751	Feb 16	21:28:04	40606	-46393	T+	pp	0.0376	2.7753	1.8025	325.7	214.3	99.5
41	02	-1733	Feb 28	05:21:35	40197	-46170	T+	pp	0.0822	2.6907	1.7232	324.1	213.4	98.4
42	03	-1715	Mar 10	13:07:40	39789	-45947	T+	pp	0.1337	2.5937	1.6313	322.2	212.0	95.9
43	04	-1697	Mar 21	20:47:23	39384	-45724	T+	-p	0.1911	2.4861	1.5283	319.9	209.8	91.6
44	05	-1679	Apr 01	04:21:26	38981	-45501	T+	-p	0.2536	2.3692	1.4156	317.0	206.6	84.8
45	06	-1661	Apr 12	11:50:29	38580	-45278	T	-p	0.3207	2.2442	1.2942	313.4	202.3	74.4
46	07	-1643	Apr 22	19:15:48	38181	-45055	T	-p	0.3916	2.1127	1.1658	309.2	196.7	58.2
47	08	-1625	May 04	02:38:48	37784	-44832	T	-a	0.4646	1.9774	1.0329	304.1	189.6	27.0
48	09	-1607	May 14	10:00:50	37390	-44609	P	-a	0.5388	1.8404	0.8976	298.3	180.8	-
49	10	-1589	May 25	17:21:52	36997	-44386	P	-a	0.6141	1.7016	0.7599	291.6	170.1	-
50	11	-1571	Jun 05	00:45:31	36606	-44163	P	-a	0.6874	1.5670	0.6255	284.3	157.6	-
51	12	-1553	Jun 16	08:10:54	36218	-43940	P	-a	0.7593	1.4353	0.4935	276.2	142.8	-
52	13	-1535	Jun 26	15:41:38	35831	-43717	P	-a	0.8271	1.3115	0.3686	267.8	125.6	-
53	14	-1517	Jul 07	23:15:38	35447	-43494	P	-a	0.8922	1.1928	0.2484	258.8	104.9	-
54	15	-1499	Jul 18	06:57:33	35065	-43271	P	-a	0.9507	1.0866	0.1400	250.0	79.9	-
55	16	-1481	Jul 29	14:44:44	34684	-43048	P	-a	1.0048	0.9886	0.0393	241.2	42.9	-
56	17	-1463	Aug 08	22:40:18	34306	-42825	N	-a	1.0519	0.9037	-0.0487	232.8	-	-

57	18	-1445	Aug 20	06:42:31	33930	-42602	N	-a	1.0937	0.8288	-0.1269	225.0	-	-
58	19	-1427	Aug 30	14:54:15	33556	-42379	N	-a	1.1275	0.7684	-0.1908	218.2	-	-
59	20	-1409	Sep 10	23:12:59	33184	-42156	N	-a	1.1554	0.7191	-0.2437	212.5	-	-
60	21	-1391	Sep 21	07:39:42	32814	-41933	N	-a	1.1767	0.6818	-0.2846	208.0	-	-
61	22	-1373	Oct 02	16:13:15	32446	-41710	N	-a	1.1924	0.6548	-0.3151	204.7	-	-
62	23	-1355	Oct 13	00:53:43	32080	-41487	N	-a	1.2025	0.6378	-0.3353	202.7	-	-
63	24	-1337	Oct 24	09:38:41	31717	-41264	N	-a	1.2089	0.6276	-0.3483	201.6	-	-
64	25	-1319	Nov 03	18:27:26	31355	-41041	N	-a	1.2122	0.6228	-0.3556	201.3	-	-
65	26	-1301	Nov 15	03:18:13	30996	-40818	N	-a	1.2137	0.6209	-0.3595	201.4	-	-
66	27	-1283	Nov 25	12:10:19	30638	-40595	N	-a	1.2144	0.6205	-0.3615	201.7	-	-
67	28	-1265	Dec 06	21:00:15	30283	-40372	N	-a	1.2168	0.6167	-0.3663	201.6	-	-
68	29	-1247	Dec 17	05:48:19	29929	-40149	N	-a	1.2207	0.6097	-0.3739	200.9	-	-
69	30	-1229	Dec 28	14:31:03	29578	-39926	N	-a	1.2290	0.5946	-0.3892	199.1	-	-
70	31	-1210	Jan 07	23:08:43	29229	-39703	N	-a	1.2411	0.5724	-0.4113	196.2	-	-
71	32	-1192	Jan 19	07:37:48	28882	-39480	N	-a	1.2601	0.5374	-0.4459	191.2	-	-
72	33	-1174	Jan 29	16:00:00	28537	-39257	N	-a	1.2843	0.4927	-0.4900	184.2	-	-
73	34	-1156	Feb 10	00:12:32	28194	-39034	N	-a	1.3162	0.4338	-0.5483	174.3	-	-
74	35	-1138	Feb 20	08:15:50	27853	-38811	N	-a	1.3550	0.3624	-0.6192	160.8	-	-
75	36	-1120	Mar 02	16:08:53	27514	-38588	N	-a	1.4014	0.2770	-0.7043	142.1	-	-
76	37	-1102	Mar 13	23:53:16	27177	-38365	N	-a	1.4542	0.1801	-0.8010	115.9	-	-
77	38	-1084	Mar 24	07:28:36	26843	-38142	Ne	-a	1.5136	0.0712	-0.9103	73.8	-	-

SAROS SERIES

Saros series 6 contains 86 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-50	-2624 Aug 04 09:59:32	62889 -57185	N	a-	1.5278	0.0539	-0.9446	65.1	-	-	-	-	-
02	-49	-2606 Aug 15 17:51:27	62380 -56962	N	a-	1.4854	0.1316	-0.8669	100.8	-	-	-	-	-
03	-48	-2588 Aug 26 01:54:20	61872 -56739	N	a-	1.4509	0.1949	-0.8038	121.6	-	-	-	-	-
04	-47	-2570 Sep 06 10:06:35	61367 -56516	N	a-	1.4234	0.2454	-0.7534	135.4	-	-	-	-	-
05	-46	-2552 Sep 16 18:28:46	60863 -56293	N	a-	1.4030	0.2829	-0.7159	144.5	-	-	-	-	-
06	-45	-2534 Sep 28 02:57:27	60362 -56070	N	a-	1.3872	0.3117	-0.6868	150.8	-	-	-	-	-
07	-44	-2516 Oct 08 11:34:36	59863 -55847	N	a-	1.3778	0.3287	-0.6692	154.2	-	-	-	-	-
08	-43	-2498 Oct 19 20:16:08	59366 -55624	N	a-	1.3717	0.3394	-0.6574	156.1	-	-	-	-	-
09	-42	-2480 Oct 30 05:02:31	58871 -55401	N	a-	1.3691	0.3434	-0.6519	156.6	-	-	-	-	-
10	-41	-2462 Nov 10 13:49:33	58378 -55178	N	a-	1.3669	0.3464	-0.6468	156.8	-	-	-	-	-
11	-40	-2444 Nov 20 22:38:02	57887 -54955	N	a-	1.3654	0.3478	-0.6428	156.7	-	-	-	-	-
12	-39	-2426 Dec 02 07:24:11	57398 -54732	N	a-	1.3619	0.3526	-0.6349	157.3	-	-	-	-	-
13	-38	-2408 Dec 12 16:07:36	56911 -54509	N	a-	1.3560	0.3616	-0.6223	158.7	-	-	-	-	-
14	-37	-2390 Dec 24 00:46:07	56427 -54286	N	a-	1.3461	0.3779	-0.6021	161.5	-	-	-	-	-
15	-36	-2371 Jan 03 09:19:41	55944 -54063	N	a-	1.3321	0.4014	-0.5744	165.7	-	-	-	-	-
16	-35	-2353 Jan 14 17:45:27	55464 -53840	N	a-	1.3116	0.4368	-0.5344	171.8	-	-	-	-	-
17	-34	-2335 Jan 25 02:04:18	54985 -53617	N	a-	1.2850	0.4833	-0.4834	179.5	-	-	-	-	-

18	-33	-2317	Feb 05	10:14:54	54509	-53394	N	a-	1.2517	0.5420	-0.4202	188.5	-	-
19	-32	-2299	Feb 15	18:18:49	54034	-53171	N	a-	1.2129	0.6110	-0.3468	198.4	-	-
20	-31	-2281	Feb 27	02:13:09	53562	-52948	N	a-	1.1662	0.6948	-0.2589	209.4	-	-
21	-30	-2263	Mar 09	10:01:40	53092	-52725	N	a-	1.1144	0.7879	-0.1620	220.5	-	-
22	-29	-2245	Mar 20	17:42:16	52624	-52502	N	a-	1.0558	0.8936	-0.0530	231.9	-	-
23	-28	-2227	Mar 31	01:18:42	52158	-52279	P	a-	0.9938	1.0060	0.0622	242.8	53.9	-
24	-27	-2209	Apr 11	08:47:51	51694	-52056	P	a-	0.9258	1.1298	0.1882	253.6	92.1	-
25	-26	-2191	Apr 21	16:15:19	51232	-51833	P	a-	0.8562	1.2566	0.3166	263.5	117.3	-
26	-25	-2173	May 02	23:38:28	50772	-51610	P	a-	0.7827	1.3910	0.4518	272.9	137.4	-
27	-24	-2155	May 13	07:01:30	50314	-51387	P	a-	0.7093	1.5257	0.5867	281.3	153.3	-
28	-23	-2137	May 24	14:23:16	49859	-51164	P	a-	0.6346	1.6630	0.7235	288.8	166.6	-
29	-22	-2119	Jun 03	21:47:39	49405	-50941	P	a-	0.5621	1.7967	0.8559	295.4	177.3	-
30	-21	-2101	Jun 15	05:14:10	48953	-50718	P	a-	0.4914	1.9274	0.9847	301.0	186.0	-
31	-20	-2083	Jun 25	12:44:10	48504	-50495	T	a-	0.4237	2.0529	1.1077	305.8	193.0	47.6
32	-19	-2065	Jul 06	20:19:17	48057	-50272	T	p-	0.3603	2.1707	1.2223	309.9	198.5	66.0
33	-18	-2047	Jul 17	04:00:05	47611	-50049	T	p-	0.3018	2.2800	1.3280	313.2	202.7	77.3
34	-17	-2029	Jul 28	11:47:53	47168	-49826	T+	p-	0.2495	2.3780	1.4219	316.0	205.9	84.8
35	-16	-2011	Aug 07	19:42:16	46727	-49603	T+	p-	0.2030	2.4656	1.5050	318.3	208.2	89.9
36	-15	-1993	Aug 19	03:45:11	46288	-49380	T+	p-	0.1639	2.5396	1.5744	320.2	209.8	93.2
37	-14	-1975	Aug 29	11:55:30	45851	-49157	T+	p-	0.1314	2.6018	1.6318	321.8	211.0	95.3
38	-13	-1957	Sep 09	20:13:35	45416	-48934	T+	pp	0.1059	2.6510	1.6762	323.3	211.9	96.6
39	-12	-1939	Sep 20	04:38:42	44983	-48711	T+	pp	0.0866	2.6887	1.7092	324.6	212.5	97.4
40	-11	-1921	Oct 01	13:10:59	44552	-48488	T+	pp	0.0741	2.7140	1.7300	325.8	213.0	97.9
41	-10	-1903	Oct 11	21:48:28	44123	-48265	T+	pp	0.0661	2.7307	1.7426	326.9	213.4	98.1
42	-09	-1885	Oct 23	06:30:03	43697	-48042	T+	pp	0.0620	2.7402	1.7483	328.0	213.8	98.3
43	-08	-1867	Nov 02	15:14:41	43272	-47819	T+	pp	0.0610	2.7436	1.7485	329.1	214.2	98.4
44	-07	-1849	Nov 14	00:01:20	42850	-47596	T+	pp	0.0623	2.7426	1.7447	330.1	214.6	98.5
45	-06	-1831	Nov 24	08:46:54	42429	-47373	T+	pp	0.0631	2.7421	1.7421	331.1	215.0	98.6

46	-05	-1813	Dec 05	17:30:53	42011	-47150	T+	pp	0.0633	2.7428	1.7410	332.1	215.5	98.7
47	-04	-1795	Dec 16	02:10:11	41594	-46927	T+	pp	0.0600	2.7493	1.7464	333.1	216.1	99.0
48	-03	-1777	Dec 27	10:45:26	41180	-46704	T+	pp	0.0540	2.7608	1.7571	334.1	216.7	99.4
49	-02	-1758	Jan 06	19:11:58	40768	-46481	T+	pp	0.0416	2.7837	1.7796	335.2	217.4	100.0
50	-01	-1740	Jan 18	03:32:07	40358	-46258	T+	pp	0.0246	2.8149	1.8106	336.3	218.2	100.5
51	00	-1722	Jan 28	11:41:42	39950	-46035	T-	pp	-0.0002	2.8598	1.8555	337.3	218.9	101.0
52	01	-1704	Feb 08	19:42:44	39544	-45812	T-	pp	-0.0313	2.8026	1.7983	338.3	219.5	101.1
53	02	-1686	Feb 19	03:31:51	39140	-45589	T-	pp	-0.0716	2.7287	1.7245	339.2	219.8	100.4
54	03	-1668	Mar 01	11:12:32	38738	-45366	T-	-p	-0.1178	2.6441	1.6397	339.7	219.6	98.6
55	04	-1650	Mar 12	18:42:09	38339	-45143	T-	-p	-0.1720	2.5447	1.5399	339.8	218.6	95.1
56	05	-1632	Mar 23	02:02:37	37941	-44920	T-	-p	-0.2329	2.4335	1.4279	339.3	216.6	88.9
57	06	-1614	Apr 03	09:13:48	37545	-44697	T	-a	-0.3005	2.3100	1.3032	338.0	213.2	78.6
58	07	-1596	Apr 13	16:18:14	37152	-44474	T	-a	-0.3728	2.1781	1.1697	335.9	208.2	61.8
59	08	-1578	Apr 24	23:15:47	36760	-44251	T	-h	-0.4497	2.0381	1.0276	332.6	201.3	26.1
60	09	-1560	May 05	06:07:29	36371	-44028	P	-h	-0.5302	1.8916	0.8785	328.2	191.9	-
61	10	-1542	May 16	12:55:45	35984	-43805	P	-h	-0.6125	1.7422	0.7259	322.4	179.7	-
62	11	-1524	May 26	19:41:44	35598	-43582	P	-t	-0.6958	1.5913	0.5712	315.3	164.1	-
63	12	-1506	Jun 07	02:26:22	35215	-43359	P	-t	-0.7790	1.4408	0.4165	306.8	144.0	-
64	13	-1488	Jun 17	09:11:54	34834	-43136	P	-t	-0.8603	1.2940	0.2650	297.1	117.9	-
65	14	-1470	Jun 28	15:59:33	34455	-42913	P	-t	-0.9386	1.1529	0.1187	286.1	80.8	-
66	15	-1452	Jul 08	22:51:31	34078	-42690	Nx	-t	-1.0123	1.0205	-0.0194	274.3	-	-
67	16	-1434	Jul 20	05:46:19	33703	-42467	N	-t	-1.0826	0.8945	-0.1512	261.4	-	-
68	17	-1416	Jul 30	12:48:27	33330	-42244	N	-t	-1.1458	0.7817	-0.2702	248.3	-	-
69	18	-1398	Aug 10	19:56:11	32960	-42021	N	-t	-1.2034	0.6790	-0.3790	234.8	-	-
70	19	-1380	Aug 21	03:12:46	32591	-41798	N	-t	-1.2529	0.5914	-0.4728	221.9	-	-
71	20	-1362	Sep 01	10:35:34	32225	-41575	N	-t	-1.2963	0.5148	-0.5556	209.4	-	-
72	21	-1344	Sep 11	18:08:19	31860	-41352	N	-t	-1.3312	0.4538	-0.6224	198.4	-	-
73	22	-1326	Sep 23	01:47:49	31498	-41129	N	-t	-1.3598	0.4040	-0.6777	188.8	-	-

74	23	-1308	Oct 03	09:35:09	31137	-40906	N	-t	-1.3814	0.3669	-0.7199	181.1	-	-
75	24	-1290	Oct 14	17:28:23	30779	-40683	N	-t	-1.3978	0.3391	-0.7522	175.0	-	-
76	25	-1272	Oct 25	01:27:54	30423	-40460	N	-t	-1.4083	0.3217	-0.7733	171.2	-	-
77	26	-1254	Nov 05	09:30:33	30069	-40237	N	-t	-1.4162	0.3087	-0.7893	168.3	-	-
78	27	-1236	Nov 15	17:35:03	29716	-40014	N	-t	-1.4221	0.2990	-0.8011	166.1	-	-
79	28	-1218	Nov 27	01:40:07	29366	-39791	N	-t	-1.4270	0.2907	-0.8108	164.2	-	-
80	29	-1200	Dec 07	09:44:03	29019	-39568	N	-t	-1.4320	0.2818	-0.8202	162.0	-	-
81	30	-1182	Dec 18	17:43:32	28673	-39345	N	-t	-1.4403	0.2665	-0.8352	157.9	-	-
82	31	-1164	Dec 29	01:38:08	28329	-39122	N	-t	-1.4517	0.2449	-0.8558	151.8	-	-
83	32	-1145	Jan 09	09:25:25	27987	-38899	N	-t	-1.4686	0.2130	-0.8859	142.0	-	-
84	33	-1127	Jan 19	17:05:49	27648	-38676	N	-t	-1.4904	0.1719	-0.9248	128.0	-	-
85	34	-1109	Jan 31	00:35:41	27310	-38453	N	-t	-1.5198	0.1166	-0.9773	105.9	-	-
86	35	-1091	Feb 10	07:57:27	26974	-38230	Ne	-t	-1.5551	0.0501	-1.0406	69.9	-	-

SAROS SERIES

7

Saros series 7 contains 89 lunar eclipses.

PHASE

DURATIONS

SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-41	-2595 Jul 16 00:47:46	62072	-56827	Nb	a-	-1.5479	0.0007	-0.9656	7.0	-	-	
02	-40	-2577 Jul 27 08:31:25	61566	-56604	N	a-	-1.5027	0.0862	-0.8854	79.8	-	-	
03	-39	-2559 Aug 06 16:22:51	61062	-56381	N	a-	-1.4646	0.1591	-0.8182	108.0	-	-	
04	-38	-2541 Aug 18 00:22:01	60560	-56158	N	a-	-1.4334	0.2193	-0.7638	126.6	-	-	
05	-37	-2523 Aug 28 08:28:21	60060	-55935	N	a-	-1.4085	0.2678	-0.7210	139.9	-	-	
06	-36	-2505 Sep 08 16:42:21	59562	-55712	N	a-	-1.3906	0.3035	-0.6911	149.0	-	-	
07	-35	-2487 Sep 19 01:03:15	59066	-55489	N	a-	-1.3790	0.3276	-0.6726	155.0	-	-	
08	-34	-2469 Sep 30 09:30:49	58572	-55266	N	a-	-1.3738	0.3399	-0.6655	158.3	-	-	
09	-33	-2451 Oct 10 18:02:06	58080	-55043	N	a-	-1.3723	0.3450	-0.6651	160.1	-	-	
10	-32	-2433 Oct 22 02:38:36	57591	-54820	N	a-	-1.3757	0.3409	-0.6736	159.8	-	-	
11	-31	-2415 Nov 01 11:16:27	57103	-54597	N	a-	-1.3807	0.3336	-0.6846	158.7	-	-	
12	-30	-2397 Nov 12 19:55:40	56618	-54374	N	a-	-1.3878	0.3222	-0.6991	156.7	-	-	
13	-29	-2379 Nov 23 04:31:57	56134	-54151	N	a-	-1.3931	0.3137	-0.7102	155.3	-	-	
14	-28	-2361 Dec 04 13:06:38	55653	-53928	N	a-	-1.3980	0.3056	-0.7201	153.9	-	-	
15	-27	-2343 Dec 14 21:35:38	55174	-53705	N	a-	-1.3989	0.3048	-0.7224	154.3	-	-	
16	-26	-2325 Dec 26 05:58:31	54696	-53482	N	a-	-1.3957	0.3112	-0.7169	156.3	-	-	
17	-25	-2306 Jan 05 14:12:56	54221	-53259	N	a-	-1.3863	0.3287	-0.7000	160.9	-	-	
18	-24	-2288 Jan 16 22:18:48	53748	-53036	N	h-	-1.3710	0.3569	-0.6721	167.8	-	-	
19	-23	-2270 Jan 27 06:14:21	53277	-52813	N	h-	-1.3482	0.3987	-0.6303	177.2	-	-	
20	-22	-2252 Feb 07 13:59:26	52808	-52590	N	h-	-1.3179	0.4544	-0.5746	188.8	-	-	
21	-21	-2234 Feb 17 21:33:37	52341	-52367	N	t-	-1.2795	0.5248	-0.5043	202.3	-	-	
22	-20	-2216 Feb 29 04:57:40	51877	-52144	N	t-	-1.2339	0.6087	-0.4206	216.8	-	-	
23	-19	-2198 Mar 11 12:10:20	51414	-51921	N	t-	-1.1798	0.7080	-0.3217	232.4	-	-	
24	-18	-2180 Mar 21 19:14:09	50953	-51698	N	t-	-1.1194	0.8192	-0.2112	248.1	-	-	

25 -17 -2162 Apr 02 02:08:37 50495 -51475 N t- -1.0523 0.9429 -0.0886 263.7 - -

26 -16 -2144 Apr 12 08:56:36 50038 -51252 P t- -0.9804 1.0757 0.0427 278.8 49.0 -

27 -15 -2126 Apr 23 15:36:13 49584 -51029 P t- -0.9023 1.2199 0.1849 293.3 100.3 -

28 -14 -2108 May 03 22:12:53 49131 -50806 P t- -0.8225 1.3676 0.3302 306.6 131.7 -

29 -13 -2090 May 15 04:44:49 48681 -50583 P t- -0.7396 1.5212 0.4808 318.9 155.7 -

30 -12 -2072 May 25 11:16:45 48233 -50360 P t- -0.6571 1.6742 0.6306 329.7 174.6 -

31 -11 -2054 Jun 05 17:46:44 47787 -50137 P t- -0.5735 1.8295 0.7820 339.3 190.0 -

32 -10 -2036 Jun 16 00:20:29 47343 -49914 P t- -0.4936 1.9784 0.9267 347.4 202.1 -

33 -09 -2018 Jun 27 06:55:53 46901 -49691 T t- -0.4158 2.1235 1.0671 354.3 211.7 41.6

34 -08 -2000 Jul 07 13:36:10 46461 -49468 T t- -0.3426 2.2603 1.1989 360.0 219.1 68.7

35 -07 -1982 Jul 18 20:21:53 46023 -49245 T pp -0.2744 2.3880 1.3214 364.6 224.6 83.7

36 -06 -1964 Jul 29 03:15:13 45587 -49022 T- pp -0.2132 2.5030 1.4312 368.2 228.5 92.9

37 -05 -1946 Aug 09 10:16:29 45154 -48799 T- pp -0.1590 2.6051 1.5279 371.0 231.2 98.6

38 -04 -1928 Aug 19 17:25:21 44722 -48576 T- pp -0.1117 2.6946 1.6122 373.1 233.0 102.1

39 -03 -1910 Aug 31 00:44:07 44292 -48353 T- pp -0.0731 2.7679 1.6804 374.8 234.0 103.9

40 -02 -1892 Sep 10 08:11:00 43865 -48130 T- pp -0.0416 2.8281 1.7359 376.1 234.6 104.8

41 -01 -1874 Sep 21 15:46:41 43439 -47907 T- pp -0.0177 2.8742 1.7777 377.1 234.9 105.1

42 00 -1856 Oct 01 23:29:24 43016 -47684 T+ pp 0.0003 2.9081 1.8078 377.9 235.0 105.0

43 01 -1838 Oct 13 07:19:54 42595 -47461 T+ pp 0.0117 2.8886 1.7853 378.6 235.1 104.9

44 02 -1820 Oct 23 15:15:07 42176 -47238 T+ pp 0.0191 2.8762 1.7706 379.0 235.1 104.8

45 03 -1802 Nov 03 23:14:11 41758 -47015 T+ pp 0.0233 2.8692 1.7621 379.4 235.1 104.7

46 04 -1784 Nov 14 07:15:24 41343 -46792 T+ pp 0.0259 2.8649 1.7571 379.5 235.1 104.7

47 05 -1766 Nov 25 15:17:28 40930 -46569 T+ pp 0.0280 2.8609 1.7533 379.5 235.1 104.7

48 06 -1748 Dec 05 23:16:41 40520 -46346 T+ pp 0.0323 2.8524 1.7459 379.3 235.1 104.7

49 07 -1730 Dec 17 07:12:40 40111 -46123 T+ pp 0.0394 2.8384 1.7338 379.0 235.1 104.6

50 08 -1712 Dec 27 15:02:57 39704 -45900 T+ pp 0.0514 2.8151 1.7132 378.4 234.9 104.4

51 09 -1693 Jan 07 22:47:52 39299 -45677 T+ pp 0.0681 2.7828 1.6841 377.7 234.7 103.9

52 10 -1675 Jan 18 06:22:49 38897 -45454 T+ pp 0.0931 2.7349 1.6402 376.6 234.1 103.0

53	11	-1657	Jan 29	13:50:58	38496	-45231	T+	pp	0.1239	2.6763	1.5858	375.3	233.2	101.2		
54	12	-1639	Feb 08	21:08:10	38098	-45008	T+	pp	0.1639	2.6005	1.5148	373.5	231.7	98.1		
55	13	-1621	Feb 20	04:18:27	37701	-44785	T+	pp	0.2099	2.5136	1.4327	371.1	229.5	93.2		
56	14	-1603	Mar 02	11:17:33	37307	-44562	T+	pp	0.2656	2.4089	1.3330	368.0	226.1	85.1		
57	15	-1585	Mar 13	18:11:00	36915	-44339	T	-p	0.3265	2.2946	1.2237	364.1	221.4	72.5		
58	16	-1567	Mar 24	00:55:18	36524	-44116	T	-t	0.3951	2.1662	1.1001	359.0	214.9	50.5		
59	17	-1549	Apr 04	07:35:04	36136	-43893	P	-t	0.4681	2.0299	0.9685	352.9	206.4	-		
60	18	-1531	Apr 14	14:08:31	35750	-43670	P	-t	0.5468	1.8834	0.8263	345.3	195.2	-		
61	19	-1513	Apr 25	20:40:13	35366	-43447	P	-t	0.6274	1.7335	0.6805	336.5	181.3	-		
62	20	-1495	May 06	03:09:16	34984	-43224	P	-t	0.7108	1.5786	0.5292	326.1	163.4	-		
63	21	-1477	May 17	09:38:22	34604	-43001	P	-t	0.7948	1.4230	0.3767	314.2	140.8	-		
64	22	-1459	May 27	16:08:46	34227	-42778	P	-t	0.8779	1.2690	0.2254	300.9	111.1	-		
65	23	-1441	Jun 07	22:42:36	33851	-42555	P	-t	0.9586	1.1197	0.0785	286.3	66.8	-		
66	24	-1423	Jun 18	05:20:59	33477	-42332	N	-t	1.0362	0.9764	-0.0630	270.5	-	-		
67	25	-1405	Jun 29	12:05:01	33106	-42109	N	-t	1.1098	0.8408	-0.1973	253.7	-	-		
68	26	-1387	Jul 09	18:56:49	32736	-41886	N	-t	1.1776	0.7158	-0.3213	236.2	-	-		
69	27	-1369	Jul 21	01:57:06	32369	-41663	N	-t	1.2389	0.6030	-0.4335	218.5	-	-		
70	28	-1351	Jul 31	09:05:59	32004	-41440	N	-t	1.2939	0.5019	-0.5343	200.6	-	-		
71	29	-1333	Aug 11	16:25:39	31640	-41217	N	-t	1.3410	0.4154	-0.6206	183.4	-	-		
72	30	-1315	Aug 21	23:55:41	31279	-40994	N	-t	1.3807	0.3427	-0.6933	167.2	-	-		
73	31	-1297	Sep 02	07:37:26	30920	-40771	N	-h	1.4116	0.2860	-0.7501	153.0	-	-		
74	32	-1279	Sep 12	15:28:24	30563	-40548	N	-h	1.4361	0.2409	-0.7951	140.6	-	-		
75	33	-1261	Sep 23	23:30:44	30208	-40325	N	-h	1.4524	0.2109	-0.8248	131.5	-	-		
76	34	-1243	Oct 04	07:41:35	29855	-40102	N	-h	1.4629	0.1913	-0.8439	125.0	-	-		
77	35	-1225	Oct 15	16:01:09	29504	-39879	N	-a	1.4674	0.1826	-0.8517	121.8	-	-		
78	36	-1207	Oct 26	00:26:41	29156	-39656	N	-a	1.4681	0.1808	-0.8522	120.8	-	-		
79	37	-1189	Nov 06	08:58:09	28809	-39433	N	-a	1.4650	0.1855	-0.8456	121.9	-	-		
80	38	-1171	Nov 16	17:32:45	28464	-39210	N	-a	1.4601	0.1932	-0.8354	123.9	-	-		

SAROS SERIES

8

											PHASE			
											DURATIONS			
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE				MAG.	MAG.	m	m	m
GREATEST														
ECLIPSE														

01	-34	-2494	Aug 08	00:01:34	59261	-55577	N	t-	1.5365	0.0821	-1.0044	89.0	-	-
02	-33	-2476	Aug 18	07:09:33	58767	-55354	N	t-	1.4926	0.1647	-0.9258	125.3	-	-
03	-32	-2458	Aug 29	14:28:07	58274	-55131	N	t-	1.4569	0.2322	-0.8619	148.1	-	-
04	-31	-2440	Sep 08	21:55:36	57784	-54908	N	t-	1.4276	0.2875	-0.8099	164.1	-	-
05	-30	-2422	Sep 20	05:32:15	57295	-54685	N	t-	1.4054	0.3298	-0.7705	175.1	-	-
06	-29	-2404	Sep 30	13:16:47	56809	-54462	N	t-	1.3888	0.3613	-0.7412	182.8	-	-
07	-28	-2386	Oct 11	21:09:15	56325	-54239	N	t-	1.3781	0.3817	-0.7224	187.5	-	-
08	-27	-2368	Oct 22	05:05:56	55843	-54016	N	t-	1.3705	0.3961	-0.7087	190.6	-	-
09	-26	-2350	Nov 02	13:07:41	55363	-53793	N	t-	1.3664	0.4036	-0.7012	192.1	-	-
10	-25	-2332	Nov 12	21:10:16	54884	-53570	N	t-	1.3626	0.4101	-0.6937	193.3	-	-
11	-24	-2314	Nov 24	05:14:10	54409	-53347	N	t-	1.3591	0.4155	-0.6865	194.2	-	-
12	-23	-2296	Dec 04	13:14:05	53935	-53124	N	t-	1.3521	0.4271	-0.6722	196.3	-	-
13	-22	-2278	Dec 15	21:12:35	53463	-52901	N	t-	1.3433	0.4414	-0.6545	198.8	-	-
14	-21	-2260	Dec 26	05:04:29	52993	-52678	N	t-	1.3294	0.4649	-0.6269	203.1	-	-
15	-20	-2241	Jan 06	12:50:30	52525	-52455	N	t-	1.3098	0.4985	-0.5886	209.0	-	-
16	-19	-2223	Jan 16	20:27:42	52060	-52232	N	t-	1.2827	0.5455	-0.5364	217.0	-	-
17	-18	-2205	Jan 28	03:57:58	51596	-52009	N	t-	1.2494	0.6038	-0.4723	226.2	-	-
18	-17	-2187	Feb 07	11:19:25	51135	-51786	N	t-	1.2083	0.6762	-0.3941	236.9	-	-
19	-16	-2169	Feb 18	18:32:18	50675	-51563	N	t-	1.1597	0.7624	-0.3018	248.4	-	-
20	-15	-2151	Mar 01	01:37:21	50218	-51340	N	t-	1.1039	0.8618	-0.1964	260.4	-	-
21	-14	-2133	Mar 12	08:35:31	49763	-51117	N	t-	1.0412	0.9737	-0.0784	272.5	-	-
22	-13	-2115	Mar 22	15:27:12	49310	-50894	P	t-	0.9723	1.0973	0.0509	284.3	54.0	-
23	-12	-2097	Apr 02	22:13:45	48859	-50671	P	t-	0.8979	1.2309	0.1900	295.5	101.9	-
24	-11	-2079	Apr 13	04:56:52	48410	-50448	P	t-	0.8195	1.3722	0.3365	305.7	132.3	-
25	-10	-2061	Apr 24	11:38:11	47963	-50225	P	t-	0.7383	1.5189	0.4879	314.8	155.1	-
26	-09	-2043	May 04	18:17:57	47518	-50002	P	t-	0.6544	1.6707	0.6439	322.7	173.3	-
27	-08	-2025	May 16	00:59:22	47075	-49779	P	t-	0.5705	1.8227	0.7996	329.2	187.5	-
28	-07	-2007	May 26	07:42:45	46634	-49556	P	t-	0.4868	1.9747	0.9549	334.5	198.6	-

29 -06 -1989 Jun 06 14:31:12 46196 -49333 T h- 0.4062 2.1212 1.1041 338.4 207.0 49.8
 30 -05 -1971 Jun 16 21:23:00 45759 -49110 T a- 0.3272 2.2651 1.2501 341.3 213.2 73.4
 31 -04 -1953 Jun 28 04:23:00 45324 -48887 T+ p- 0.2538 2.3990 1.3856 343.0 217.4 86.5
 32 -03 -1935 Jul 08 11:29:27 44892 -48664 T+ p- 0.1844 2.5257 1.5135 343.8 220.1 94.5
 33 -02 -1917 Jul 19 18:45:27 44462 -48441 T+ pp 0.1221 2.6396 1.6283 343.9 221.5 99.1
 34 -01 -1899 Jul 30 02:09:52 44033 -48218 T+ pp 0.0657 2.7428 1.7319 343.4 221.9 101.3
 35 00 -1881 Aug 10 09:45:33 43607 -47995 T+ pp 0.0177 2.8309 1.8202 342.5 221.6 101.9
 36 01 -1863 Aug 20 17:31:26 43183 -47772 T- pp -0.0229 2.8212 1.8106 341.3 220.8 101.5
 37 02 -1845 Sep 01 01:27:01 42761 -47549 T- pp -0.0567 2.7593 1.7488 340.0 219.8 100.6
 38 03 -1827 Sep 11 09:33:07 42341 -47326 T- pp -0.0825 2.7118 1.7013 338.7 218.8 99.4
 39 04 -1809 Sep 22 17:48:39 41923 -47103 T- pp -0.1013 2.6772 1.6669 337.4 217.7 98.3
 40 05 -1791 Oct 03 02:13:16 41507 -46880 T- pp -0.1137 2.6543 1.6445 336.2 216.8 97.4
 41 06 -1773 Oct 14 10:44:03 41093 -46657 T- pp -0.1217 2.6391 1.6302 335.0 216.0 96.7
 42 07 -1755 Oct 24 19:21:55 40681 -46434 T- pp -0.1247 2.6330 1.6254 333.9 215.4 96.3
 43 08 -1737 Nov 05 04:03:35 40272 -46211 T- pp -0.1252 2.6312 1.6254 332.8 214.8 96.1
 44 09 -1719 Nov 15 12:48:09 39864 -45988 T- pp -0.1238 2.6326 1.6291 331.7 214.4 96.1
 45 10 -1701 Nov 26 21:32:42 39459 -45765 T- -p -0.1229 2.6328 1.6321 330.6 214.0 96.0
 46 11 -1683 Dec 07 06:16:55 39055 -45542 T- -p -0.1228 2.6312 1.6339 329.5 213.6 96.0
 47 12 -1665 Dec 18 14:57:40 38654 -45319 T- -p -0.1261 2.6233 1.6299 328.3 213.1 95.7
 48 13 -1647 Dec 28 23:34:13 38255 -45096 T- -p -0.1333 2.6078 1.6187 327.0 212.6 95.3
 49 14 -1628 Jan 09 08:05:14 37857 -44873 T- -p -0.1455 2.5831 1.5987 325.6 211.9 94.5
 50 15 -1610 Jan 19 16:30:35 37462 -44650 T- -p -0.1626 2.5492 1.5697 324.0 211.0 93.3
 51 16 -1592 Jan 31 00:47:15 37069 -44427 T- -p -0.1877 2.5007 1.5262 322.3 209.9 91.3
 52 17 -1574 Feb 10 08:57:26 36678 -44204 T- -p -0.2187 2.4412 1.4718 320.4 208.3 88.3
 53 18 -1556 Feb 21 16:59:01 36289 -43981 T- -p -0.2573 2.3678 1.4034 318.0 206.2 83.8
 54 19 -1538 Mar 04 00:54:55 35902 -43758 T -p -0.3012 2.2850 1.3253 315.4 203.4 77.3
 55 20 -1520 Mar 14 08:41:24 35517 -43535 T -p -0.3534 2.1870 1.2317 312.1 199.6 67.3
 56 21 -1502 Mar 25 16:23:45 35135 -43312 T -a -0.4095 2.0821 1.1308 308.3 194.8 52.2

57	22	-1484	Apr 04	23:58:43	34754	-43089	T	-a	-0.4724	1.9648	1.0170	303.7	188.5	19.4	
58	23	-1466	Apr 16	07:30:32	34376	-42866	P	-a	-0.5382	1.8426	0.8978	298.4	180.7	-	
59	24	-1448	Apr 26	14:56:35	33999	-42643	P	-a	-0.6090	1.7115	0.7690	292.0	170.8	-	
60	25	-1430	May 07	22:22:18	33625	-42420	P	-a	-0.6803	1.5798	0.6390	284.8	158.9	-	
61	26	-1412	May 18	05:45:10	33252	-42197	P	-a	-0.7542	1.4437	0.5038	276.6	144.0	-	
62	27	-1394	May 29	13:08:59	32882	-41974	P	-a	-0.8274	1.3093	0.3697	267.4	125.8	-	
63	28	-1376	Jun 08	20:33:09	32514	-41751	P	-a	-0.9003	1.1757	0.2357	257.2	102.4	-	
64	29	-1358	Jun 20	04:01:01	32148	-41528	P	-a	-0.9702	1.0479	0.1068	246.3	70.2	-	
65	30	-1340	Jun 30	11:31:56	31783	-41305	N	-a	-1.0375	0.9253	-0.0175	234.6	-	-	
66	31	-1322	Jul 11	19:07:26	31422	-41082	N	-a	-1.1010	0.8101	-0.1352	222.3	-	-	
67	32	-1304	Jul 22	02:49:06	31062	-40859	N	-a	-1.1594	0.7043	-0.2438	209.8	-	-	
68	33	-1286	Aug 02	10:37:32	30704	-40636	N	-a	-1.2126	0.6083	-0.3431	197.1	-	-	
69	34	-1268	Aug 12	18:33:13	30348	-40413	N	-a	-1.2597	0.5239	-0.4312	184.7	-	-	
70	35	-1250	Aug 24	02:36:43	29994	-40190	N	-a	-1.3005	0.4510	-0.5081	172.9	-	-	
71	36	-1232	Sep 03	10:48:40	29643	-39967	N	-a	-1.3344	0.3909	-0.5723	162.2	-	-	
72	37	-1214	Sep 14	19:08:36	29293	-39744	N	-a	-1.3619	0.3424	-0.6249	152.8	-	-	
73	38	-1196	Sep 25	03:35:03	28945	-39521	N	-a	-1.3842	0.3036	-0.6678	144.7	-	-	
74	39	-1178	Oct 06	12:09:06	28600	-39298	N	-a	-1.4003	0.2760	-0.6993	138.6	-	-	
75	40	-1160	Oct 16	20:48:47	28257	-39075	N	-a	-1.4115	0.2574	-0.7216	134.4	-	-	
76	41	-1142	Oct 28	05:33:32	27915	-38852	N	-a	-1.4188	0.2456	-0.7365	131.8	-	-	
77	42	-1124	Nov 07	14:20:30	27576	-38629	N	-a	-1.4239	0.2376	-0.7475	130.0	-	-	
78	43	-1106	Nov 18	23:09:57	27239	-38406	N	-a	-1.4269	0.2333	-0.7541	129.2	-	-	
79	44	-1088	Nov 29	07:59:19	26904	-38183	N	-a	-1.4297	0.2291	-0.7602	128.4	-	-	
80	45	-1070	Dec 10	16:46:42	26571	-37960	N	-a	-1.4338	0.2223	-0.7683	126.8	-	-	
81	46	-1052	Dec 21	01:30:45	26240	-37737	N	-a	-1.4401	0.2111	-0.7804	124.0	-	-	
82	47	-1033	Jan 01	10:09:48	25911	-37514	N	-a	-1.4503	0.1927	-0.7992	119.0	-	-	
83	48	-1015	Jan 11	18:42:52	25585	-37291	N	-a	-1.4648	0.1661	-0.8260	111.0	-	-	
84	49	-0997	Jan 23	03:07:35	25260	-37068	N	-a	-1.4858	0.1277	-0.8644	97.9	-	-	

85 50 -0979 Feb 02 11:24:38 24937 -36845 N -a -1.5123 0.0789 -0.9129 77.5 - -
86 51 -0961 Feb 13 19:32:15 24617 -36622 Ne -a -1.5457 0.0174 -0.9741 36.7 - -

SAROS SERIES

9

Saros series 9 contains 75 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-38	-2501 Jun 26 22:34:19	59457 -55665	Nb	a-	-1.5258	0.0525	-0.9363	64.3	-	-			
02	-37	-2483 Jul 07 05:56:05	58962 -55442	N	a-	-1.4598	0.1732	-0.8147	115.1	-	-			
03	-36	-2465 Jul 18 13:24:36	58468 -55219	N	a-	-1.3984	0.2856	-0.7018	145.8	-	-			
04	-35	-2447 Jul 28 21:04:39	57977 -54996	N	a-	-1.3455	0.3826	-0.6048	166.6	-	-			
05	-34	-2429 Aug 09 04:52:46	57488 -54773	N	a-	-1.2986	0.4688	-0.5187	182.4	-	-			
06	-33	-2411 Aug 19 12:51:41	57001 -54550	N	a-	-1.2598	0.5402	-0.4477	193.9	-	-			
07	-32	-2393 Aug 30 20:59:23	56516 -54327	N	a-	-1.2274	0.5998	-0.3885	202.6	-	-			

08	-31	-2375	Sep 10	05:17:57	56033	-54104	N	a-	-1.2032	0.6445	-0.3442	208.6	-	-
09	-30	-2357	Sep 21	13:44:20	55552	-53881	N	a-	-1.1851	0.6777	-0.3112	212.7	-	-
10	-29	-2339	Oct 01	22:18:42	55073	-53658	N	a-	-1.1730	0.7000	-0.2889	215.1	-	-
11	-28	-2321	Oct 13	06:59:26	54596	-53435	N	a-	-1.1657	0.7132	-0.2752	216.4	-	-
12	-27	-2303	Oct 23	15:46:05	54121	-53212	N	a-	-1.1626	0.7184	-0.2693	216.6	-	-
13	-26	-2285	Nov 04	00:35:04	53649	-52989	N	a-	-1.1613	0.7202	-0.2662	216.3	-	-
14	-25	-2267	Nov 14	09:26:07	53178	-52766	N	a-	-1.1614	0.7192	-0.2655	215.7	-	-
15	-24	-2249	Nov 25	18:16:18	52710	-52543	N	a-	-1.1605	0.7196	-0.2629	215.3	-	-
16	-23	-2231	Dec 06	03:05:41	52243	-52320	N	a-	-1.1589	0.7212	-0.2586	215.0	-	-
17	-22	-2213	Dec 17	11:49:48	51779	-52097	N	a-	-1.1528	0.7308	-0.2458	215.8	-	-
18	-21	-2195	Dec 27	20:30:27	51317	-51874	N	a-	-1.1438	0.7457	-0.2274	217.2	-	-
19	-20	-2176	Jan 08	05:03:32	50856	-51651	N	a-	-1.1282	0.7723	-0.1971	220.0	-	-
20	-19	-2158	Jan 18	13:30:38	50398	-51428	N	a-	-1.1080	0.8074	-0.1579	223.7	-	-
21	-18	-2140	Jan 29	21:48:26	49942	-51205	N	a-	-1.0798	0.8572	-0.1042	228.9	-	-
22	-17	-2122	Feb 09	05:59:51	49488	-50982	N	a-	-1.0463	0.9167	-0.0408	234.8	-	-
23	-16	-2104	Feb 20	14:02:30	49036	-50759	P	a-	-1.0050	0.9905	0.0367	241.8	41.6	-
24	-15	-2086	Mar 02	21:57:21	48587	-50536	P	a-	-0.9573	1.0762	0.1260	249.5	76.0	-
25	-14	-2068	Mar 13	05:44:41	48139	-50313	P	a-	-0.9033	1.1739	0.2267	257.5	100.5	-
26	-13	-2050	Mar 24	13:25:43	47693	-50090	P	a-	-0.8439	1.2815	0.3369	265.6	120.6	-
27	-12	-2032	Apr 03	21:00:58	47249	-49867	P	a-	-0.7794	1.3988	0.4563	273.6	137.9	-
28	-11	-2014	Apr 15	04:30:40	46808	-49644	P	a-	-0.7103	1.5250	0.5839	281.4	153.0	-
29	-10	-1996	Apr 25	11:57:19	46368	-49421	P	a-	-0.6385	1.6562	0.7159	288.6	166.0	-
30	-09	-1978	May 06	19:21:07	45931	-49198	P	a-	-0.5647	1.7917	0.8515	295.2	177.0	-
31	-08	-1960	May 17	02:43:37	45496	-48975	P	a-	-0.4899	1.9292	0.9884	301.1	186.4	-
32	-07	-1942	May 28	10:05:45	45062	-48752	T	a-	-0.4149	2.0674	1.1253	306.2	194.1	51.1
33	-06	-1924	Jun 07	17:29:26	44631	-48529	T	p-	-0.3417	2.2028	1.2587	310.6	200.2	70.4
34	-05	-1906	Jun 19	00:55:24	44202	-48306	T-	p-	-0.2707	2.3343	1.3876	314.2	204.9	82.5
35	-04	-1888	Jun 29	08:24:20	43775	-48083	T-	p-	-0.2027	2.4607	1.5108	317.1	208.5	90.4

36	-03	-1870	Jul 10	15:58:39	43350	-47860	T-	pp	-0.1398	2.5782	1.6244	319.5	210.9	95.4
37	-02	-1852	Jul 20	23:38:26	42927	-47637	T-	pp	-0.0820	2.6863	1.7282	321.3	212.4	98.2
38	-01	-1834	Aug 01	07:25:29	42506	-47414	T-	pp	-0.0307	2.7829	1.8201	322.7	213.2	99.4
39	00	-1816	Aug 11	15:19:00	42087	-47191	T+	pp	0.0147	2.8147	1.8469	323.9	213.6	99.6
40	01	-1798	Aug 22	23:21:06	41671	-46968	T+	pp	0.0523	2.7484	1.7754	324.9	213.6	99.0
41	02	-1780	Sep 02	07:30:28	41256	-46745	T+	-p	0.0832	2.6943	1.7159	325.8	213.5	98.0
42	03	-1762	Sep 13	15:47:21	40844	-46522	T+	-p	0.1073	2.6527	1.6691	326.7	213.3	96.9
43	04	-1744	Sep 24	00:11:36	40433	-46299	T+	-p	0.1248	2.6233	1.6346	327.7	213.2	96.0
44	05	-1726	Oct 05	08:42:15	40025	-46076	T+	-p	0.1365	2.6043	1.6107	328.7	213.2	95.3
45	06	-1708	Oct 15	17:18:35	39618	-45853	T+	-p	0.1426	2.5954	1.5973	329.9	213.4	94.9
46	07	-1690	Oct 27	01:57:43	39214	-45630	T+	-p	0.1458	2.5914	1.5894	331.0	213.7	94.7
47	08	-1672	Nov 06	10:40:38	38812	-45407	T+	-p	0.1452	2.5944	1.5889	332.2	214.2	94.8
48	09	-1654	Nov 17	19:23:28	38412	-45184	T+	-p	0.1443	2.5975	1.5890	333.4	214.7	95.0
49	10	-1636	Nov 28	04:05:58	38014	-44961	T+	-p	0.1428	2.6014	1.5905	334.6	215.2	95.2
50	11	-1618	Dec 09	12:44:28	37618	-44738	T+	-p	0.1442	2.5997	1.5870	335.7	215.7	95.3
51	12	-1600	Dec 19	21:19:42	37224	-44515	T+	-p	0.1477	2.5941	1.5800	336.7	216.2	95.3
52	13	-1582	Dec 31	05:48:22	36832	-44292	T+	-p	0.1561	2.5791	1.5641	337.6	216.5	94.9
53	14	-1563	Jan 10	14:09:53	36442	-44069	T+	-p	0.1698	2.5542	1.5387	338.4	216.7	94.0
54	15	-1545	Jan 21	22:22:29	36055	-43846	T+	-p	0.1904	2.5164	1.5007	339.0	216.5	92.4
55	16	-1527	Feb 01	06:26:14	35669	-43623	T+	-p	0.2177	2.4665	1.4507	339.3	216.0	89.7
56	17	-1509	Feb 12	14:19:27	35285	-43400	T+	-p	0.2530	2.4018	1.3859	339.2	214.8	85.4
57	18	-1491	Feb 22	22:02:45	34904	-43177	T	-p	0.2959	2.3231	1.3071	338.7	212.9	78.7
58	19	-1473	Mar 06	05:35:26	34525	-42954	T	-a	0.3466	2.2301	1.2138	337.5	209.8	68.1
59	20	-1455	Mar 16	12:59:13	34147	-42731	T	-a	0.4040	2.1250	1.1083	335.6	205.4	50.3
60	21	-1437	Mar 27	20:11:40	33772	-42508	P	-a	0.4697	2.0050	0.9875	332.6	199.0	-
61	22	-1419	Apr 07	03:16:46	33399	-42285	P	-h	0.5402	1.8762	0.8574	328.5	190.5	-
62	23	-1401	Apr 18	10:12:50	33028	-42062	P	-h	0.6170	1.7361	0.7157	322.9	179.0	-
63	24	-1383	Apr 28	17:04:15	32659	-41839	P	-t	0.6966	1.5910	0.5685	316.0	164.0	-

64	25	-1365	May 09	23:48:01	32292	-41616	P	-t	0.7812	1.4372	0.4121	307.1	143.5	-
65	26	-1347	May 20	06:30:27	31927	-41393	P	-t	0.8656	1.2840	0.2557	296.6	116.1	-
66	27	-1329	May 31	13:09:02	31564	-41170	P	-t	0.9515	1.1282	0.0962	284.0	73.1	-
67	28	-1311	Jun 10	19:48:44	31203	-40947	N	-t	1.0353	0.9765	-0.0595	269.7	-	-
68	29	-1293	Jun 22	02:27:33	30845	-40724	N	-t	1.1186	0.8259	-0.2148	253.0	-	-
69	30	-1275	Jul 02	09:10:54	30488	-40501	N	-t	1.1970	0.6845	-0.3612	234.5	-	-
70	31	-1257	Jul 13	15:57:05	30134	-40278	N	-t	1.2718	0.5500	-0.5011	213.9	-	-
71	32	-1239	Jul 23	22:48:53	29781	-40055	N	-t	1.3409	0.4261	-0.6305	191.2	-	-
72	33	-1221	Aug 04	05:46:48	29431	-39832	N	-t	1.4038	0.3135	-0.7489	166.4	-	-
73	34	-1203	Aug 14	12:52:41	29082	-39609	N	-t	1.4593	0.2146	-0.8535	139.5	-	-
74	35	-1185	Aug 25	20:06:37	28736	-39386	N	-t	1.5075	0.1291	-0.9448	109.4	-	-
75	36	-1167	Sep 05	03:28:12	28392	-39163	N	-t	1.5486	0.0566	-1.0230	73.1	-	-

SAROS SERIES

10

Saros series 10 contains 74 lunar eclipses.

PHASE

DURATIONS

SEQ. REL. CALENDAR TD ΔT LUNA ECL. QSE GAMMA PEN. UM. PEN. PAR. TOTAL

NUM.	NUM.	DATE	OF	s	NUM	TYPE	MAG.	MAG.	m	m	m
GREATEST											
ECLIPSE											
01	-37	-2454 Jun 17	21:32:06	58171 -55084	Nb a-	1.5270	0.0364	-0.9246	51.9	-	-
02	-36	-2436 Jun 28	04:56:27	57681 -54861	N a-	1.4671	0.1486	-0.8171	104.2	-	-
03	-35	-2418 Jul 09	12:25:28	57193 -54638	N a-	1.4116	0.2530	-0.7177	135.2	-	-
04	-34	-2400 Jul 19	20:01:15	56707 -54415	N a-	1.3620	0.3469	-0.6294	157.5	-	-
05	-33	-2382 Jul 31	03:41:55	56223 -54192	N a-	1.3168	0.4327	-0.5495	175.2	-	-
06	-32	-2364 Aug 10	11:31:19	55741 -53969	N a-	1.2792	0.5048	-0.4835	188.7	-	-
07	-31	-2346 Aug 21	19:27:03	55262 -53746	N a-	1.2471	0.5668	-0.4277	199.6	-	-
08	-30	-2328 Sep 01	03:31:43	54784 -53523	N a-	1.2230	0.6142	-0.3864	207.7	-	-
09	-29	-2310 Sep 12	11:42:19	54308 -53300	N a-	1.2042	0.6516	-0.3551	214.1	-	-
10	-28	-2292 Sep 22	20:01:24	53835 -53077	N a-	1.1929	0.6753	-0.3372	218.4	-	-
11	-27	-2274 Oct 04	04:25:22	53364 -52854	N a-	1.1863	0.6902	-0.3277	221.4	-	-
12	-26	-2256 Oct 14	12:54:34	52894 -52631	N a-	1.1847	0.6956	-0.3271	223.0	-	-
13	-25	-2238 Oct 25	21:26:36	52427 -52408	N a-	1.1860	0.6954	-0.3318	223.9	-	-
14	-24	-2220 Nov 05	06:01:16	51962 -52185	N a-	1.1907	0.6886	-0.3423	223.8	-	-
15	-23	-2202 Nov 16	14:34:57	51499 -51962	N a-	1.1951	0.6821	-0.3519	223.7	-	-
16	-22	-2184 Nov 26	23:06:52	51038 -51739	N a-	1.1990	0.6762	-0.3603	223.7	-	-
17	-21	-2166 Dec 08	07:34:50	50579 -51516	N a-	1.2007	0.6742	-0.3643	224.2	-	-
18	-20	-2148 Dec 18	15:58:19	50122 -51293	N h-	1.1998	0.6765	-0.3633	225.3	-	-
19	-19	-2130 Dec 30	00:13:25	49667 -51070	N h-	1.1930	0.6894	-0.3512	227.9	-	-
20	-18	-2111 Jan 09	08:21:20	49214 -50847	N h-	1.1813	0.7111	-0.3300	231.7	-	-
21	-17	-2093 Jan 20	16:18:40	48764 -50624	N h-	1.1619	0.7468	-0.2945	237.4	-	-
22	-16	-2075 Jan 31	00:07:37	48315 -50401	N t-	1.1365	0.7933	-0.2479	244.3	-	-
23	-15	-2057 Feb 11	07:43:51	47869 -50178	N t-	1.1020	0.8566	-0.1844	253.0	-	-
24	-14	-2039 Feb 21	15:11:24	47424 -49955	N t-	1.0611	0.9316	-0.1094	262.7	-	-
25	-13	-2021 Mar 04	22:26:47	46982 -49732	Nx t-	1.0113	1.0230	-0.0180	273.5	-	-

26	-12	-2003 Mar 15 05:33:00	46542 -49509	P t-	0.9547	1.1268	0.0857	284.8	69.1	-
27	-11	-1985 Mar 26 12:28:30	46103 -49286	P t-	0.8902	1.2455	0.2037	296.5	105.2	-
28	-10	-1967 Apr 05 19:16:42	45667 -49063	P t-	0.8205	1.3738	0.3313	307.9	132.0	-
29	-09	-1949 Apr 17 01:57:10	45233 -48840	P t-	0.7453	1.5125	0.4687	319.0	154.2	-
30	-08	-1931 Apr 27 08:31:07	44801 -48617	P t-	0.6654	1.6599	0.6144	329.4	173.0	-
31	-07	-1913 May 08 15:00:57	44371 -48394	P t-	0.5828	1.8126	0.7649	338.9	188.7	-
32	-06	-1895 May 18 21:28:01	43943 -48171	P t-	0.4983	1.9690	0.9188	347.3	201.8	-
33	-05	-1877 May 30 03:54:06	43517 -47948	T t-	0.4136	2.1259	1.0727	354.5	212.3	43.3
34	-04	-1859 Jun 09 10:19:36	43094 -47725	T tp	0.3290	2.2828	1.2262	360.5	220.6	72.7
35	-03	-1841 Jun 20 16:48:26	42672 -47502	T+ pp	0.2475	2.4344	1.3739	365.3	226.8	88.7
36	-02	-1823 Jun 30 23:20:30	42253 -47279	T+ pp	0.1688	2.5808	1.5161	368.9	231.0	98.3
37	-01	-1805 Jul 12 05:57:54	41835 -47056	T+ pp	0.0949	2.7187	1.6497	371.6	233.6	103.6
38	00	-1787 Jul 22 12:41:32	41420 -46833	T+ pp	0.0264	2.8467	1.7731	373.3	234.8	105.8
39	01	-1769 Aug 02 19:33:51	41006 -46610	T- pp	-0.0346	2.8339	1.7555	374.3	235.0	105.5
40	02	-1751 Aug 13 02:34:35	40595 -46387	T- pp	-0.0887	2.7371	1.6540	374.8	234.3	103.6
41	03	-1733 Aug 24 09:43:25	40186 -46164	T- pp	-0.1359	2.6529	1.5652	375.0	233.1	100.6
42	04	-1715 Sep 03 17:01:59	39779 -45941	T- pp	-0.1749	2.5835	1.4915	374.9	231.7	96.9
43	05	-1697 Sep 15 00:29:36	39373 -45718	T- pp	-0.2062	2.5280	1.4319	374.7	230.2	93.2
44	06	-1679 Sep 25 08:05:39	38970 -45495	T- pp	-0.2305	2.4852	1.3856	374.5	228.9	89.7
45	07	-1661 Oct 06 15:49:22	38570 -45272	T- -p	-0.2483	2.4541	1.3514	374.3	227.8	86.8
46	08	-1643 Oct 16 23:39:54	38171 -45049	T- -p	-0.2606	2.4326	1.3277	374.1	226.9	84.5
47	09	-1625 Oct 28 07:36:18	37774 -44826	T- -p	-0.2681	2.4198	1.3132	374.0	226.4	83.1
48	10	-1607 Nov 07 15:34:49	37379 -44603	T -p	-0.2737	2.4098	1.3025	373.8	225.9	81.9
49	11	-1589 Nov 18 23:36:43	36987 -44380	T -p	-0.2768	2.4041	1.2969	373.5	225.6	81.3
50	12	-1571 Nov 29 07:37:33	36596 -44157	T -p	-0.2804	2.3970	1.2908	373.0	225.3	80.7
51	13	-1553 Dec 10 15:37:41	36207 -43934	T -p	-0.2851	2.3874	1.2831	372.3	224.8	79.8
52	14	-1535 Dec 20 23:32:21	35821 -43711	T -p	-0.2945	2.3689	1.2672	371.3	224.1	78.0
53	15	-1516 Jan 01 07:24:05	35437 -43488	T -p	-0.3065	2.3450	1.2468	370.0	223.0	75.5

54	16	-1498	Jan 11	15:07:57	35054	-43265	T	-p	-0.3249	2.3093	1.2150	368.2	221.5	71.2
55	17	-1480	Jan 22	22:44:56	34674	-43042	T	-p	-0.3495	2.2619	1.1722	365.9	219.2	64.7
56	18	-1462	Feb 02	06:12:40	34296	-42819	T	-t	-0.3817	2.2003	1.1156	362.9	216.0	54.0
57	19	-1444	Feb 13	13:32:47	33920	-42596	T	-t	-0.4206	2.1262	1.0467	359.3	211.8	35.1
58	20	-1426	Feb 23	20:43:51	33546	-42373	P	-t	-0.4672	2.0380	0.9640	354.8	206.2	-
59	21	-1408	Mar 06	03:46:32	33174	-42150	P	-t	-0.5208	1.9368	0.8683	349.3	198.8	-
60	22	-1390	Mar 17	10:41:40	32804	-41927	P	-t	-0.5811	1.8235	0.7605	342.6	189.2	-
61	23	-1372	Mar 27	17:30:10	32436	-41704	P	-t	-0.6472	1.6995	0.6418	334.6	177.0	-
62	24	-1354	Apr 08	00:12:17	32071	-41481	P	-t	-0.7190	1.5653	0.5126	325.1	161.1	-
63	25	-1336	Apr 18	06:50:50	31707	-41258	P	-t	-0.7941	1.4251	0.3772	314.1	140.8	-
64	26	-1318	Apr 29	13:26:08	31345	-41035	P	-t	-0.8725	1.2789	0.2354	301.4	113.3	-
65	27	-1300	May 09	20:01:35	30986	-40812	P	-t	-0.9513	1.1323	0.0927	287.0	72.3	-
66	28	-1282	May 21	02:35:37	30629	-40589	N	-t	-1.0320	0.9824	-0.0537	270.6	-	-
67	29	-1264	May 31	09:13:39	30273	-40366	N	-t	-1.1101	0.8376	-0.1955	252.7	-	-
68	30	-1246	Jun 11	15:53:46	29920	-40143	N	-t	-1.1875	0.6944	-0.3362	232.5	-	-
69	31	-1228	Jun 21	22:40:26	29569	-39920	N	-t	-1.2600	0.5602	-0.4683	210.8	-	-
70	32	-1210	Jul 03	05:31:26	29220	-39697	N	-t	-1.3298	0.4315	-0.5955	186.6	-	-
71	33	-1192	Jul 13	12:32:11	28873	-39474	N	-t	-1.3926	0.3156	-0.7102	160.7	-	-
72	34	-1174	Jul 24	19:40:05	28528	-39251	N	-t	-1.4506	0.2089	-0.8162	131.6	-	-
73	35	-1156	Aug 04	02:58:14	28185	-39028	N	-t	-1.5011	0.1159	-0.9087	98.5	-	-
74	36	-1138	Aug 15	10:25:35	27844	-38805	Ne	-h	-1.5451	0.0351	-0.9893	54.4	-	-

SAROS SERIES

Saros series 11 contains 74 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-34	-2371 Jun 29 12:50:32	55931 -54057	Nb	t-	-1.5291	0.0895	-0.9845	92.6	-	-	-	-	-
02	-33	-2353 Jul 10 19:24:53	55451 -53834	N	t-	-1.4586	0.2204	-0.8567	143.8	-	-	-	-	-
03	-32	-2335 Jul 21 02:07:33	54972 -53611	N	t-	-1.3941	0.3405	-0.7399	177.0	-	-	-	-	-
04	-31	-2317 Aug 01 08:59:29	54496 -53388	N	t-	-1.3367	0.4476	-0.6363	201.0	-	-	-	-	-
05	-30	-2299 Aug 11 15:59:50	54022 -53165	N	t-	-1.2856	0.5430	-0.5442	219.6	-	-	-	-	-
06	-29	-2281 Aug 22 23:11:23	53549 -52942	N	t-	-1.2429	0.6229	-0.4675	233.4	-	-	-	-	-
07	-28	-2263 Sep 02 06:32:23	53079 -52719	N	t-	-1.2075	0.6894	-0.4039	244.1	-	-	-	-	-
08	-27	-2245 Sep 13 14:04:23	52611 -52496	N	t-	-1.1805	0.7402	-0.3556	251.6	-	-	-	-	-
09	-26	-2227 Sep 23 21:43:43	52145 -52273	N	t-	-1.1590	0.7807	-0.3173	257.3	-	-	-	-	-
10	-25	-2209 Oct 05 05:32:58	51681 -52050	N	t-	-1.1452	0.8067	-0.2926	260.7	-	-	-	-	-
11	-24	-2191 Oct 15 13:27:51	51220 -51827	N	t-	-1.1355	0.8249	-0.2753	262.8	-	-	-	-	-
12	-23	-2173 Oct 26 21:28:42	50760 -51604	N	t-	-1.1301	0.8348	-0.2653	263.8	-	-	-	-	-
13	-22	-2155 Nov 06 05:32:12	50302 -51381	N	t-	-1.1264	0.8413	-0.2581	264.2	-	-	-	-	-
14	-21	-2137 Nov 17 13:38:23	49846 -51158	N	t-	-1.1239	0.8449	-0.2528	264.2	-	-	-	-	-
15	-20	-2119 Nov 27 21:43:43	49393 -50935	N	t-	-1.1204	0.8500	-0.2452	264.3	-	-	-	-	-
16	-19	-2101 Dec 09 05:47:01	48941 -50712	N	t-	-1.1144	0.8594	-0.2325	264.7	-	-	-	-	-

17	-18	-2083	Dec 19	13:46:57	48492	-50489	N	t-	-1.1050	0.8748	-0.2131	265.9	-	-
18	-17	-2065	Dec 30	21:42:08	48045	-50266	N	t-	-1.0905	0.8988	-0.1843	268.0	-	-
19	-16	-2046	Jan 10	05:30:00	47599	-50043	N	t-	-1.0695	0.9347	-0.1432	271.3	-	-
20	-15	-2028	Jan 21	13:10:56	47156	-49820	N	t-	-1.0421	0.9822	-0.0899	275.7	-	-
21	-14	-2010	Jan 31	20:43:50	46715	-49597	Nx	t-	-1.0071	1.0433	-0.0226	281.2	-	-
22	-13	-1992	Feb 12	04:09:50	46276	-49374	P	t-	-0.9653	1.1167	0.0571	287.5	57.2	-
23	-12	-1974	Feb 22	11:25:58	45839	-49151	P	t-	-0.9146	1.2066	0.1534	294.6	92.1	-
24	-11	-1956	Mar 04	18:36:11	45404	-48928	P	t-	-0.8581	1.3071	0.2602	301.8	117.8	-
25	-10	-1938	Mar 16	01:37:58	44971	-48705	P	t-	-0.7937	1.4221	0.3815	309.3	139.7	-
26	-09	-1920	Mar 26	08:35:29	44541	-48482	P	t-	-0.7246	1.5457	0.5112	316.3	158.0	-
27	-08	-1902	Apr 06	15:26:31	44112	-48259	P	t-	-0.6490	1.6817	0.6528	323.0	173.9	-
28	-07	-1884	Apr 16	22:16:03	43685	-48036	P	h-	-0.5708	1.8224	0.7988	328.8	187.1	-
29	-06	-1866	Apr 28	05:02:45	43261	-47813	P	h-	-0.4893	1.9696	0.9507	333.7	198.0	-
30	-05	-1848	May 08	11:49:34	42838	-47590	T	h-	-0.4066	2.1192	1.1047	337.6	206.7	49.9
31	-04	-1830	May 19	18:37:15	42418	-47367	T	a-	-0.3234	2.2700	1.2592	340.5	213.3	74.4
32	-03	-1812	May 30	01:27:55	41999	-47144	T-	p-	-0.2416	2.4185	1.4109	342.2	218.0	88.4
33	-02	-1794	Jun 10	08:23:06	41583	-46921	T-	pp	-0.1621	2.5630	1.5580	343.0	220.8	96.7
34	-01	-1776	Jun 20	15:22:56	41169	-46698	T-	pp	-0.0855	2.7026	1.6997	342.9	222.2	101.2
35	00	-1758	Jul 01	22:30:36	40757	-46475	T-	pp	-0.0144	2.8322	1.8309	342.0	222.2	102.5
36	01	-1740	Jul 12	05:45:25	40347	-46252	T+	pp	0.0515	2.7636	1.7634	340.5	221.2	101.7
37	02	-1722	Jul 23	13:09:47	39939	-46029	T+	pp	0.1105	2.6550	1.6554	338.6	219.4	99.1
38	03	-1704	Aug 02	20:42:26	39533	-45806	T+	pp	0.1634	2.5577	1.5585	336.4	217.2	95.2
39	04	-1686	Aug 14	04:26:03	39129	-45583	T+	pp	0.2081	2.4757	1.4766	334.2	214.6	90.7
40	05	-1668	Aug 24	12:18:49	38727	-45360	T+	-p	0.2456	2.4068	1.4077	331.9	212.1	85.9
41	06	-1650	Sep 04	20:21:35	38328	-45137	T	-p	0.2756	2.3519	1.3526	329.8	209.7	81.3
42	07	-1632	Sep 15	04:33:38	37930	-44914	T	-p	0.2985	2.3099	1.3105	328.0	207.7	77.3
43	08	-1614	Sep 26	12:55:27	37535	-44691	T	-p	0.3143	2.2809	1.2816	326.3	206.0	74.1
44	09	-1596	Oct 06	21:24:52	37141	-44468	T	-p	0.3242	2.2625	1.2636	325.0	204.8	72.0

45	10	-1578	Oct 18	06:01:03	36750	-44245	T	-p	0.3293	2.2528	1.2546	323.8	203.9	70.8
46	11	-1560	Oct 28	14:42:27	36360	-44022	T	-p	0.3307	2.2497	1.2526	322.9	203.3	70.4
47	12	-1542	Nov 08	23:28:34	35973	-43799	T	-p	0.3290	2.2520	1.2564	322.0	203.0	70.7
48	13	-1524	Nov 19	08:15:38	35588	-43576	T	-p	0.3273	2.2542	1.2607	321.2	202.8	71.1
49	14	-1506	Nov 30	17:04:02	35205	-43353	T	-p	0.3251	2.2569	1.2660	320.3	202.6	71.5
50	15	-1488	Dec 11	01:49:55	34824	-43130	T	-p	0.3257	2.2541	1.2664	319.3	202.2	71.5
51	16	-1470	Dec 22	10:34:13	34445	-42907	T	-p	0.3280	2.2481	1.2639	318.3	201.8	71.1
52	17	-1451	Jan 01	19:11:48	34068	-42684	T	-p	0.3366	2.2303	1.2500	316.9	200.9	69.5
53	18	-1433	Jan 13	03:45:44	33693	-42461	T	-p	0.3488	2.2059	1.2299	315.4	199.8	67.0
54	19	-1415	Jan 23	12:11:11	33321	-42238	T	-p	0.3686	2.1673	1.1957	313.5	198.1	62.5
55	20	-1397	Feb 03	20:30:24	32950	-42015	T	-p	0.3939	2.1185	1.1515	311.2	195.9	55.7
56	21	-1379	Feb 14	04:40:05	32581	-41792	T	-p	0.4276	2.0545	1.0919	308.4	192.7	44.2
57	22	-1361	Feb 25	12:43:42	32215	-41569	T	-a	0.4667	1.9805	1.0223	305.2	188.7	22.2
58	23	-1343	Mar 07	20:38:48	31850	-41346	P	-a	0.5135	1.8925	0.9385	301.2	183.4	-
59	24	-1325	Mar 19	04:26:40	31488	-41123	P	-a	0.5667	1.7931	0.8428	296.4	176.6	-
60	25	-1307	Mar 29	12:07:49	31128	-40900	P	-a	0.6257	1.6831	0.7362	290.8	167.9	-
61	26	-1289	Apr 09	19:43:51	30769	-40677	P	-a	0.6893	1.5649	0.6208	284.1	157.0	-
62	27	-1271	Apr 20	03:15:02	30413	-40454	P	-a	0.7572	1.4392	0.4973	276.3	143.2	-
63	28	-1253	May 01	10:42:31	30059	-40231	P	-a	0.8285	1.3075	0.3672	267.3	125.4	-
64	29	-1235	May 11	18:07:55	29707	-40008	P	-a	0.9016	1.1729	0.2335	256.9	101.9	-
65	30	-1217	May 23	01:32:39	29357	-39785	P	-a	0.9752	1.0378	0.0986	245.3	67.5	-
66	31	-1199	Jun 02	08:56:29	29009	-39562	N	-a	1.0494	0.9020	-0.0377	232.1	-	-
67	32	-1181	Jun 13	16:22:17	28663	-39339	N	-a	1.1219	0.7695	-0.1714	217.5	-	-
68	33	-1163	Jun 23	23:49:57	28320	-39116	N	-a	1.1924	0.6410	-0.3016	201.3	-	-
69	34	-1145	Jul 05	07:22:19	27978	-38893	N	-a	1.2589	0.5202	-0.4249	183.7	-	-
70	35	-1127	Jul 15	14:57:49	27638	-38670	N	-a	1.3224	0.4053	-0.5429	164.2	-	-
71	36	-1109	Jul 26	22:40:31	27301	-38447	N	-a	1.3795	0.3023	-0.6494	143.5	-	-
72	37	-1091	Aug 06	06:28:49	26965	-38224	N	-a	1.4317	0.2085	-0.7472	120.4	-	-

73 38 -1073 Aug 17 14:25:20 26632 -38001 N -a 1.4771 0.1274 -0.8325 95.0 - -
74 39 -1055 Aug 27 22:28:12 26301 -37778 N -a 1.5170 0.0564 -0.9081 63.8 - -

SAROS SERIES

12

Saros series 12 contains 73 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-37	-2360 May 28 19:39:07	55640 -53922	Nb a-	1.5214	0.0575 -0.9250	67.0	-	-					
02	-36	-2342 Jun 09 02:46:57	55161 -53699	N a-	1.4444	0.1977 -0.7826	122.3	-	-					
03	-35	-2324 Jun 19 10:00:08	54684 -53476	N a-	1.3704	0.3327 -0.6461	156.1	-	-					
04	-34	-2306 Jun 30 17:20:50	54209 -53253	N a-	1.3012	0.4591 -0.5187	180.5	-	-					
05	-33	-2288 Jul 11 00:48:59	53735 -53030	N a-	1.2372	0.5763 -0.4010	199.3	-	-					
06	-32	-2270 Jul 22 08:25:15	53265 -52807	N a-	1.1790	0.6830 -0.2941	214.1	-	-					
07	-31	-2252 Aug 01 16:10:54	52796 -52584	N a-	1.1275	0.7776 -0.1998	225.7	-	-					

08	-30	-2234	Aug 13	00:06:02	52329	-52361	N	a-	1.0830	0.8595	-0.1184	234.7	-	-
09	-29	-2216	Aug 23	08:10:11	51864	-52138	N	a-	1.0455	0.9287	-0.0499	241.6	-	-
10	-28	-2198	Sep 03	16:23:59	51402	-51915	P	a-	1.0154	0.9843	0.0049	246.7	15.5	-
11	-27	-2180	Sep 14	00:46:45	50941	-51692	P	a-	0.9923	1.0271	0.0470	250.4	47.6	-
12	-26	-2162	Sep 25	09:18:14	50482	-51469	P	a-	0.9759	1.0574	0.0767	252.7	60.5	-
13	-25	-2144	Oct 05	17:55:34	50026	-51246	P	a-	0.9639	1.0797	0.0988	254.3	68.3	-
14	-24	-2126	Oct 17	02:39:57	49572	-51023	P	a-	0.9573	1.0917	0.1107	254.9	72.0	-
15	-23	-2108	Oct 27	11:28:22	49119	-50800	P	a-	0.9540	1.0975	0.1170	255.0	73.9	-
16	-22	-2090	Nov 07	20:20:09	48669	-50577	P	a-	0.9531	1.0988	0.1192	254.7	74.4	-
17	-21	-2072	Nov 18	05:12:06	48221	-50354	P	a-	0.9521	1.0999	0.1216	254.4	75.1	-
18	-20	-2054	Nov 29	14:04:15	47775	-50131	P	a-	0.9512	1.1006	0.1242	254.0	75.7	-
19	-19	-2036	Dec 09	22:54:07	47331	-49908	P	a-	0.9483	1.1049	0.1308	254.0	77.6	-
20	-18	-2018	Dec 21	07:39:45	46889	-49685	P	a-	0.9420	1.1149	0.1436	254.5	81.1	-
21	-17	-2000	Dec 31	16:20:11	46449	-49462	P	a-	0.9315	1.1327	0.1643	255.6	86.4	-
22	-16	-1981	Jan 12	00:54:10	46011	-49239	P	a-	0.9159	1.1598	0.1947	257.5	93.6	-
23	-15	-1963	Jan 22	09:20:50	45576	-49016	P	a-	0.8943	1.1977	0.2360	260.3	102.4	-
24	-14	-1945	Feb 02	17:38:57	45142	-48793	P	a-	0.8659	1.2481	0.2898	263.9	112.6	-
25	-13	-1927	Feb 13	01:49:25	44710	-48570	P	a-	0.8312	1.3100	0.3550	268.2	123.4	-
26	-12	-1909	Feb 24	09:51:39	44281	-48347	P	a-	0.7901	1.3839	0.4319	273.1	134.6	-
27	-11	-1891	Mar 06	17:44:59	43853	-48124	P	a-	0.7416	1.4715	0.5224	278.6	146.0	-
28	-10	-1873	Mar 18	01:31:20	43428	-47901	P	a-	0.6873	1.5699	0.6231	284.3	157.1	-
29	-09	-1855	Mar 28	09:10:38	43005	-47678	P	a-	0.6272	1.6793	0.7344	290.1	167.6	-
30	-08	-1837	Apr 08	16:45:03	42583	-47455	P	a-	0.5632	1.7961	0.8525	295.7	177.1	-
31	-07	-1819	Apr 19	00:12:57	42164	-47232	P	a-	0.4938	1.9230	0.9802	301.1	185.9	-
32	-06	-1801	Apr 30	07:38:52	41747	-47009	T	a-	0.4228	2.0532	1.1104	306.0	193.4	48.2
33	-05	-1783	May 10	15:01:12	41332	-46786	T	p-	0.3488	2.1895	1.2460	310.4	199.8	69.0
34	-04	-1765	May 21	22:22:53	40919	-46563	T	p-	0.2745	2.3263	1.3816	314.1	204.9	82.1
35	-03	-1747	Jun 01	05:43:31	40508	-46340	T+	p-	0.1997	2.4646	1.5178	317.2	208.9	91.0

36	-02	-1729	Jun 12	13:06:26	40100	-46117	T+	pp	0.1272	2.5991	1.6496	319.6	211.6	96.4
37	-01	-1711	Jun 22	20:31:26	39693	-45894	T+	pp	0.0568	2.7299	1.7771	321.4	213.2	99.3
38	00	-1693	Jul 04	03:59:35	39288	-45671	T-	pp	-0.0105	2.8169	1.8602	322.6	213.8	100.0
39	01	-1675	Jul 14	11:32:56	38886	-45448	T-	pp	-0.0728	2.7048	1.7436	323.4	213.6	98.9
40	02	-1657	Jul 25	19:11:47	38485	-45225	T-	-p	-0.1299	2.6024	1.6363	323.8	212.7	96.3
41	03	-1639	Aug 05	02:57:27	38087	-45002	T-	-p	-0.1808	2.5119	1.5404	324.0	211.4	92.5
42	04	-1621	Aug 16	10:49:00	37690	-44779	T-	-p	-0.2260	2.4316	1.4546	324.0	209.8	87.9
43	05	-1603	Aug 26	18:49:14	37296	-44556	T-	-p	-0.2636	2.3656	1.3829	324.1	208.1	83.0
44	06	-1585	Sep 07	02:56:13	36904	-44333	T	-p	-0.2951	2.3107	1.3223	324.3	206.6	78.0
45	07	-1567	Sep 17	11:11:15	36514	-44110	T	-p	-0.3191	2.2694	1.2754	324.7	205.3	73.4
46	08	-1549	Sep 28	19:32:38	36126	-43887	T	-p	-0.3374	2.2385	1.2390	325.3	204.3	69.3
47	09	-1531	Oct 09	04:01:25	35740	-43664	T	-p	-0.3490	2.2199	1.2154	326.1	203.8	66.4
48	10	-1513	Oct 20	12:34:23	35356	-43441	T	-p	-0.3567	2.2081	1.1989	327.1	203.5	64.3
49	11	-1495	Oct 30	21:11:11	34974	-43218	T	-p	-0.3606	2.2030	1.1896	328.2	203.6	63.1
50	12	-1477	Nov 11	05:49:58	34594	-42995	T	-p	-0.3623	2.2017	1.1846	329.4	203.9	62.5
51	13	-1459	Nov 21	14:30:00	34217	-42772	T	-p	-0.3620	2.2039	1.1838	330.7	204.4	62.5
52	14	-1441	Dec 02	23:07:29	33841	-42549	T	-p	-0.3633	2.2027	1.1801	331.8	204.8	62.1
53	15	-1423	Dec 13	07:42:22	33467	-42326	T	-a	-0.3659	2.1989	1.1743	332.9	205.1	61.4
54	16	-1405	Dec 24	16:11:25	33096	-42103	T	-a	-0.3726	2.1874	1.1615	333.7	205.1	59.5
55	17	-1386	Jan 04	00:35:26	32726	-41880	T	-a	-0.3826	2.1695	1.1427	334.2	204.8	56.4
56	18	-1368	Jan 15	08:49:30	32359	-41657	T	-a	-0.3997	2.1384	1.1110	334.4	203.8	50.4
57	19	-1350	Jan 25	16:56:22	31994	-41434	T	-a	-0.4219	2.0978	1.0701	334.1	202.3	40.7
58	20	-1332	Feb 06	00:51:45	31631	-41211	T	-a	-0.4527	2.0412	1.0135	333.2	199.6	18.2
59	21	-1314	Feb 16	08:38:47	31269	-40988	P	-a	-0.4896	1.9736	0.9459	331.7	195.9	-
60	22	-1296	Feb 27	16:13:13	30910	-40765	P	-a	-0.5358	1.8888	0.8609	329.3	190.4	-
61	23	-1278	Mar 09	23:39:27	30553	-40542	P	-h	-0.5879	1.7933	0.7652	325.9	183.1	-
62	24	-1260	Mar 20	06:54:02	30199	-40319	P	-h	-0.6485	1.6823	0.6537	321.2	173.0	-
63	25	-1242	Mar 31	14:00:14	29846	-40096	P	-t	-0.7151	1.5606	0.5313	315.1	159.7	-

64	26	-1224	Apr 10	20:56:55	29495	-39873	P	-t	-0.7884	1.4266	0.3962	307.1	141.3	-
65	27	-1206	Apr 22	03:47:23	29146	-39650	P	-t	-0.8657	1.2855	0.2536	297.4	115.8	-
66	28	-1188	May 02	10:31:21	28800	-39427	P	-t	-0.9471	1.1372	0.1032	285.4	75.7	-
67	29	-1170	May 13	17:10:03	28455	-39204	N	-t	-1.0314	0.9838	-0.0526	270.8	-	-
68	30	-1152	May 23	23:45:49	28113	-38981	N	-t	-1.1169	0.8284	-0.2110	253.5	-	-
69	31	-1134	Jun 04	06:19:42	27772	-38758	N	-t	-1.2027	0.6727	-0.3701	232.9	-	-
70	32	-1116	Jun 14	12:53:10	27434	-38535	N	-t	-1.2874	0.5192	-0.5275	208.5	-	-
71	33	-1098	Jun 25	19:27:54	27098	-38312	N	-t	-1.3698	0.3702	-0.6808	179.2	-	-
72	34	-1080	Jul 06	02:06:02	26763	-38089	N	-t	-1.4482	0.2286	-0.8271	143.1	-	-
73	35	-1062	Jul 17	08:48:57	26431	-37866	Ne	-t	-1.5218	0.0961	-0.9646	94.2	-	-

SAROS SERIES

13

Saros series 13 contains 73 lunar eclipses.

											PHASE			
											DURATIONS			
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														

01	-37	-2313	May 20	18:51:42	54396	-53341	Nb	a-	-1.5253	0.0384	-0.9207	53.3	-	-
02	-36	-2295	May 31	02:06:54	53922	-53118	N	a-	-1.4575	0.1645	-0.7979	109.6	-	-
03	-35	-2277	Jun 11	09:21:44	53450	-52895	N	a-	-1.3902	0.2901	-0.6764	144.3	-	-
04	-34	-2259	Jun 21	16:40:14	52980	-52672	N	a-	-1.3265	0.4094	-0.5617	170.2	-	-
05	-33	-2241	Jul 03	00:01:14	52513	-52449	N	a-	-1.2653	0.5243	-0.4520	191.3	-	-
06	-32	-2223	Jul 13	07:28:19	52047	-52226	N	a-	-1.2098	0.6288	-0.3530	208.3	-	-
07	-31	-2205	Jul 24	15:00:15	51584	-52003	N	a-	-1.1591	0.7249	-0.2630	222.4	-	-
08	-30	-2187	Aug 03	22:38:46	51122	-51780	N	a-	-1.1147	0.8096	-0.1845	234.1	-	-
09	-29	-2169	Aug 15	06:24:15	50663	-51557	N	a-	-1.0769	0.8823	-0.1183	243.7	-	-
10	-28	-2151	Aug 25	14:17:46	50206	-51334	N	a-	-1.0464	0.9413	-0.0657	251.4	-	-
11	-27	-2133	Sep 05	22:18:30	49751	-51111	N	a-	-1.0225	0.9884	-0.0250	257.5	-	-
12	-26	-2115	Sep 16	06:26:40	49298	-50888	P	a-	-1.0055	1.0228	0.0032	262.2	13.0	-
13	-25	-2097	Sep 27	14:41:32	48846	-50665	P	a-	-0.9947	1.0456	0.0200	265.6	32.5	-
14	-24	-2079	Oct 07	23:02:23	48398	-50442	P	a-	-0.9896	1.0578	0.0268	268.0	37.7	-
15	-23	-2061	Oct 19	07:26:59	47951	-50219	P	a-	-0.9883	1.0627	0.0267	269.6	37.7	-
16	-22	-2043	Oct 29	15:55:34	47506	-49996	P	a-	-0.9908	1.0602	0.0199	270.5	32.7	-
17	-21	-2025	Nov 10	00:25:11	47063	-49773	P	a-	-0.9947	1.0549	0.0109	271.0	24.3	-
18	-20	-2007	Nov 20	08:54:47	46622	-49550	P	h-	-0.9995	1.0476	0.0006	271.3	5.8	-
19	-19	-1989	Dec 01	17:21:02	46184	-49327	Nx	h-	-1.0024	1.0436	-0.0058	271.9	-	-
20	-18	-1971	Dec 12	01:44:10	45747	-49104	Nx	h-	-1.0035	1.0424	-0.0087	272.7	-	-
21	-17	-1953	Dec 23	10:01:00	45313	-48881	Nx	h-	-1.0001	1.0493	-0.0030	274.3	-	-
22	-16	-1934	Jan 02	18:10:11	44880	-48658	P	h-	-0.9913	1.0656	0.0128	276.8	26.7	-
23	-15	-1916	Jan 14	02:10:19	44450	-48435	P	t-	-0.9760	1.0938	0.0407	280.4	47.6	-
24	-14	-1898	Jan 24	10:00:54	44022	-48212	P	t-	-0.9537	1.1347	0.0817	285.2	67.3	-
25	-13	-1880	Feb 04	17:41:24	43596	-47989	P	t-	-0.9239	1.1892	0.1365	291.1	86.6	-
26	-12	-1862	Feb 15	01:10:16	43171	-47766	P	t-	-0.8853	1.2598	0.2075	298.2	106.0	-
27	-11	-1844	Feb 26	08:28:57	42749	-47543	P	t-	-0.8390	1.3447	0.2927	306.0	124.7	-

28	-10	-1826	Mar 08	15:36:35	42329	-47320	P	t-	-0.7844	1.4448	0.3931	314.5	142.7	-
29	-09	-1808	Mar 18	22:34:42	41912	-47097	P	t-	-0.7225	1.5582	0.5066	323.1	159.6	-
30	-08	-1790	Mar 30	05:23:07	41496	-46874	P	t-	-0.6532	1.6855	0.6338	331.9	175.4	-
31	-07	-1772	Apr 09	12:04:16	41082	-46651	P	t-	-0.5785	1.8227	0.7705	340.2	189.4	-
32	-06	-1754	Apr 20	18:38:47	40670	-46428	P	t-	-0.4989	1.9693	0.9161	347.9	201.8	-
33	-05	-1736	May 01	01:06:59	40261	-46205	T	t-	-0.4147	2.1245	1.0701	354.9	212.4	42.6
34	-04	-1718	May 12	07:31:52	39853	-45982	T	tp	-0.3284	2.2837	1.2276	360.8	220.9	73.0
35	-03	-1700	May 22	13:54:01	39448	-45759	T-	pp	-0.2406	2.4458	1.3875	365.6	227.4	89.9
36	-02	-1682	Jun 02	20:16:30	39044	-45536	T-	pp	-0.1534	2.6072	1.5464	369.1	231.9	100.0
37	-01	-1664	Jun 13	02:38:41	38643	-45313	T-	pp	-0.0666	2.7680	1.7042	371.5	234.5	105.2
38	00	-1646	Jun 24	09:04:57	38244	-45090	T+	pp	0.0164	2.8616	1.7946	372.8	235.2	106.3
39	01	-1628	Jul 04	15:35:10	37847	-44867	T+	pp	0.0954	2.7186	1.6479	373.0	234.4	103.9
40	02	-1610	Jul 15	22:11:14	37452	-44644	T+	pp	0.1691	2.5851	1.5108	372.4	232.2	98.4
41	03	-1592	Jul 26	04:54:09	37058	-44421	T+	pp	0.2370	2.4626	1.3842	371.1	228.9	89.9
42	04	-1574	Aug 06	11:45:42	36668	-44198	T	-p	0.2976	2.3535	1.2710	369.4	224.8	78.9
43	05	-1556	Aug 16	18:46:42	36279	-43975	T	-t	0.3500	2.2593	1.1727	367.5	220.5	65.2
44	06	-1538	Aug 28	01:55:56	35892	-43752	T	-t	0.3956	2.1777	1.0873	365.4	216.0	47.6
45	07	-1520	Sep 07	09:16:04	35507	-43529	T	-t	0.4321	2.1126	1.0184	363.6	211.8	22.4
46	08	-1502	Sep 18	16:45:04	35125	-43306	P	-t	0.4613	2.0606	0.9632	361.9	208.2	-
47	09	-1484	Sep 29	00:24:04	34744	-43083	P	-t	0.4825	2.0232	0.9230	360.6	205.2	-
48	10	-1466	Oct 10	08:09:24	34365	-42860	P	-t	0.4984	1.9950	0.8926	359.5	202.9	-
49	11	-1448	Oct 20	16:02:59	33989	-42637	P	-t	0.5078	1.9787	0.8747	358.8	201.4	-
50	12	-1430	Nov 01	00:00:34	33615	-42414	P	-t	0.5139	1.9679	0.8631	358.1	200.3	-
51	13	-1412	Nov 11	08:02:12	33242	-42191	P	-t	0.5169	1.9623	0.8576	357.6	199.7	-
52	14	-1394	Nov 22	16:04:46	32872	-41968	P	-t	0.5194	1.9573	0.8535	356.9	199.2	-
53	15	-1376	Dec 03	00:08:15	32504	-41745	P	-t	0.5216	1.9524	0.8503	356.2	198.8	-
54	16	-1358	Dec 14	08:08:27	32138	-41522	P	-t	0.5266	1.9420	0.8424	355.0	197.9	-
55	17	-1340	Dec 24	16:05:25	31774	-41299	P	-t	0.5346	1.9256	0.8294	353.4	196.6	-

56	18	-1321	Jan 04	23:56:45	31412	-41076	P	-t	0.5477	1.8995	0.8074	351.3	194.4	-
57	19	-1303	Jan 15	07:42:58	31052	-40853	P	-t	0.5657	1.8641	0.7766	348.5	191.4	-
58	20	-1285	Jan 26	15:19:54	30694	-40630	P	-t	0.5918	1.8136	0.7313	344.9	186.9	-
59	21	-1267	Feb 05	22:50:25	30338	-40407	P	-t	0.6236	1.7525	0.6756	340.4	181.0	-
60	22	-1249	Feb 17	06:11:28	29985	-40184	P	-t	0.6638	1.6757	0.6047	334.8	173.0	-
61	23	-1231	Feb 27	13:26:20	29633	-39961	P	-t	0.7097	1.5885	0.5234	328.1	162.7	-
62	24	-1213	Mar 10	20:30:51	29284	-39738	P	-t	0.7647	1.4845	0.4254	319.8	148.6	-
63	25	-1195	Mar 21	03:30:44	28936	-39515	P	-t	0.8242	1.3724	0.3191	310.2	130.4	-
64	26	-1177	Apr 01	10:22:20	28591	-39292	P	-t	0.8908	1.2475	0.1998	298.7	104.8	-
65	27	-1159	Apr 11	17:10:45	28248	-39069	P	-t	0.9605	1.1167	0.0745	285.4	64.9	-
66	28	-1141	Apr 22	23:53:24	27906	-38846	N	-t	1.0355	0.9766	-0.0606	269.7	-	-
67	29	-1123	May 03	06:35:53	27567	-38623	N	-t	1.1111	0.8355	-0.1971	252.1	-	-
68	30	-1105	May 14	13:16:24	27230	-38400	N	-t	1.1887	0.6911	-0.3374	231.6	-	-
69	31	-1087	May 24	19:57:56	26895	-38177	N	-t	1.2661	0.5472	-0.4777	208.1	-	-
70	32	-1069	Jun 05	02:41:25	26562	-37954	N	-t	1.3423	0.4059	-0.6158	180.9	-	-
71	33	-1051	Jun 15	09:29:14	26231	-37731	N	-t	1.4154	0.2705	-0.7486	148.9	-	-
72	34	-1033	Jun 26	16:22:30	25902	-37508	N	-t	1.4849	0.1419	-0.8752	108.7	-	-
73	35	-1015	Jul 06	23:21:46	25576	-37285	Ne	-t	1.5502	0.0212	-0.9942	42.3	-	-

SAROS SERIES

Saros series 14 contains 73 lunar eclipses.

PHASE													
DURATIONS													
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-34	-2230 Jun 01	09:34:33	52231	-52314	Nb t-	1.5220	0.0999	-0.9689	97.7	-	-	
02	-33	-2212 Jun 11	15:54:19	51766	-52091	N t-	1.4401	0.2510	-0.8195	152.8	-	-	
03	-32	-2194 Jun 22	22:16:49	51304	-51868	N t-	1.3595	0.3998	-0.6727	190.3	-	-	
04	-31	-2176 Jul 03	04:46:45	50844	-51645	N t-	1.2844	0.5388	-0.5359	218.1	-	-	
05	-30	-2158 Jul 14	11:21:55	50386	-51422	N t-	1.2129	0.6713	-0.4059	240.5	-	-	
06	-29	-2140 Jul 24	18:07:43	49930	-51199	N t-	1.1490	0.7899	-0.2899	257.8	-	-	
07	-28	-2122 Aug 05	01:01:41	49476	-50976	N t-	1.0909	0.8979	-0.1847	271.9	-	-	
08	-27	-2104 Aug 15	08:06:18	49024	-50753	N t-	1.0406	0.9915	-0.0936	282.9	-	-	
09	-26	-2086 Aug 26	15:20:46	48574	-50530	Nx t-	0.9976	1.0717	-0.0160	291.5	-	-	
10	-25	-2068 Sep 05	22:47:00	48127	-50307	P t-	0.9636	1.1351	0.0453	297.8	52.1	-	
11	-24	-2050 Sep 17	06:22:42	47681	-50084	P t-	0.9363	1.1862	0.0945	302.5	74.6	-	
12	-23	-2032 Sep 27	14:07:15	47238	-49861	P t-	0.9154	1.2251	0.1321	305.8	87.6	-	
13	-22	-2014 Oct 08	22:00:16	46796	-49638	P t-	0.9008	1.2523	0.1586	307.8	95.5	-	
14	-21	-1996 Oct 19	06:00:26	46357	-49415	P t-	0.8915	1.2694	0.1756	308.8	100.1	-	
15	-20	-1978 Oct 30	14:05:11	45919	-49192	P t-	0.8853	1.2804	0.1873	309.1	103.0	-	
16	-19	-1960 Nov 09	22:13:21	45484	-48969	P t-	0.8815	1.2866	0.1950	309.0	104.8	-	
17	-18	-1942 Nov 21	06:22:58	45051	-48746	P h-	0.8782	1.2917	0.2023	308.6	106.4	-	
18	-17	-1924 Dec 01	14:32:33	44620	-48523	P h-	0.8742	1.2973	0.2111	308.1	108.3	-	
19	-16	-1906 Dec 12	22:38:44	44191	-48300	P h-	0.8670	1.3086	0.2263	308.1	111.6	-	
20	-15	-1888 Dec 23	06:42:08	43763	-48077	P h-	0.8568	1.3250	0.2472	308.3	116.0	-	

21	-14	-1869	Jan 03	14:39:46	43339	-47854	P	h-	0.8416	1.3503	0.2777	309.2	122.1	-
22	-13	-1851	Jan 13	22:31:01	42916	-47631	P	h-	0.8202	1.3866	0.3199	310.8	129.9	-
23	-12	-1833	Jan 25	06:14:39	42495	-47408	P	h-	0.7917	1.4359	0.3752	313.1	139.2	-
24	-11	-1815	Feb 04	13:51:25	42076	-47185	P	h-	0.7567	1.4968	0.4426	316.0	149.2	-
25	-10	-1797	Feb 15	21:20:35	41660	-46962	P	h-	0.7146	1.5707	0.5230	319.4	159.6	-
26	-09	-1779	Feb 26	04:41:16	41245	-46739	P	h-	0.6646	1.6591	0.6182	323.2	170.4	-
27	-08	-1761	Mar 09	11:55:41	40833	-46516	P	h-	0.6083	1.7591	0.7246	327.1	180.7	-
28	-07	-1743	Mar 19	19:03:16	40422	-46293	P	h-	0.5453	1.8716	0.8435	330.9	190.4	-
29	-06	-1725	Mar 31	02:06:25	40014	-46070	P	a-	0.4775	1.9929	0.9708	334.4	199.0	-
30	-05	-1707	Apr 10	09:03:58	39608	-45847	T	a-	0.4042	2.1245	1.1083	337.4	206.6	50.6
31	-04	-1689	Apr 21	16:00:07	39203	-45624	T	a-	0.3284	2.2609	1.2498	339.7	212.6	73.2
32	-03	-1671	May 01	22:53:22	38801	-45401	T+	p-	0.2491	2.4040	1.3977	341.3	217.3	87.3
33	-02	-1653	May 13	05:47:00	38401	-45178	T+	pp	0.1691	2.5488	1.5467	342.0	220.4	96.1
34	-01	-1635	May 23	12:41:18	38003	-44955	T+	pp	0.0886	2.6946	1.6961	341.9	221.9	101.1
35	00	-1617	Jun 03	19:39:11	37607	-44732	T+	pp	0.0099	2.8376	1.8421	340.9	222.1	102.7
36	01	-1599	Jun 14	02:41:15	37213	-44509	T-	pp	-0.0664	2.7326	1.7397	339.1	220.9	101.4
37	02	-1581	Jun 25	09:48:25	36822	-44286	T-	pp	-0.1395	2.5974	1.6063	336.7	218.6	97.6
38	03	-1563	Jul 05	17:03:01	36432	-44063	T-	pp	-0.2075	2.4720	1.4823	333.7	215.3	91.4
39	04	-1545	Jul 17	00:25:07	36044	-43840	T-	p-	-0.2706	2.3559	1.3670	330.4	211.3	83.1
40	05	-1527	Jul 27	07:55:57	35659	-43617	T	p-	-0.3270	2.2520	1.2637	326.9	206.9	72.9
41	06	-1509	Aug 07	15:35:44	35275	-43394	T	p-	-0.3770	2.1602	1.1719	323.4	202.3	60.5
42	07	-1491	Aug 17	23:25:38	34894	-43171	T	p-	-0.4197	2.0819	1.0935	320.0	197.8	45.6
43	08	-1473	Aug 29	07:25:31	34514	-42948	T	p-	-0.4550	2.0173	1.0286	316.9	193.6	25.6
44	09	-1455	Sep 08	15:34:12	34137	-42725	P	a-	-0.4838	1.9647	0.9757	314.1	189.9	-
45	10	-1437	Sep 19	23:53:00	33762	-42502	P	a-	-0.5048	1.9263	0.9369	311.9	186.9	-
46	11	-1419	Sep 30	08:19:42	33389	-42279	P	a-	-0.5198	1.8989	0.9094	310.0	184.6	-
47	12	-1401	Oct 11	16:54:38	33018	-42056	P	a-	-0.5288	1.8823	0.8928	308.6	183.0	-
48	13	-1383	Oct 22	01:34:03	32649	-41833	P	a-	-0.5347	1.8712	0.8822	307.4	181.8	-

49	14	-1365	Nov 02	10:19:51	32282	-41610	P	-a	-0.5359	1.8687	0.8805	306.6	181.3	-
50	15	-1347	Nov 12	19:07:53	31917	-41387	P	-a	-0.5355	1.8688	0.8819	305.9	181.1	-
51	16	-1329	Nov 24	03:58:19	31554	-41164	P	-a	-0.5337	1.8710	0.8860	305.3	181.1	-
52	17	-1311	Dec 04	12:47:19	31194	-40941	P	-a	-0.5335	1.8704	0.8876	304.5	180.9	-
53	18	-1293	Dec 15	21:35:39	30835	-40718	P	-a	-0.5345	1.8672	0.8872	303.7	180.6	-
54	19	-1275	Dec 26	06:19:52	30479	-40495	P	-a	-0.5392	1.8570	0.8801	302.6	179.9	-
55	20	-1256	Jan 06	14:59:34	30124	-40272	P	-a	-0.5480	1.8389	0.8656	301.1	178.6	-
56	21	-1238	Jan 16	23:33:02	29772	-40049	P	-a	-0.5623	1.8107	0.8412	299.3	176.6	-
57	22	-1220	Jan 28	08:00:20	29421	-39826	P	-a	-0.5820	1.7726	0.8070	296.9	173.9	-
58	23	-1202	Feb 07	16:19:03	29073	-39603	P	-a	-0.6093	1.7206	0.7590	293.9	169.9	-
59	24	-1184	Feb 19	00:30:29	28727	-39380	P	-a	-0.6429	1.6569	0.6992	290.2	164.5	-
60	25	-1166	Mar 01	08:33:24	28383	-39157	P	-a	-0.6837	1.5802	0.6262	285.7	157.5	-
61	26	-1148	Mar 11	16:29:43	28041	-38934	P	-a	-0.7301	1.4933	0.5428	280.2	148.5	-
62	27	-1130	Mar 23	00:16:48	27701	-38711	P	-a	-0.7843	1.3923	0.4450	273.6	136.4	-
63	28	-1112	Apr 02	07:58:55	27363	-38488	P	-a	-0.8427	1.2838	0.3391	265.8	121.0	-
64	29	-1094	Apr 13	15:33:56	27027	-38265	P	-a	-0.9072	1.1644	0.2218	256.4	99.5	-
65	30	-1076	Apr 23	23:05:55	26693	-38042	P	-a	-0.9740	1.0410	0.0999	245.7	67.9	-
66	31	-1058	May 05	06:32:06	26362	-37819	N	-a	-1.0456	0.9093	-0.0311	232.9	-	-
67	32	-1040	May 15	13:57:58	26032	-37596	N	-a	-1.1173	0.7775	-0.1626	218.4	-	-
68	33	-1022	May 26	21:20:57	25704	-37373	N	-a	-1.1915	0.6416	-0.2991	201.3	-	-
69	34	-1004	Jun 06	04:45:11	25379	-37150	N	-a	-1.2645	0.5084	-0.4334	181.8	-	-
70	35	-0986	Jun 17	12:09:40	25056	-36927	N	-a	-1.3370	0.3763	-0.5675	158.6	-	-
71	36	-0968	Jun 27	19:37:55	24734	-36704	N	-a	-1.4062	0.2506	-0.6957	131.2	-	-
72	37	-0950	Jul 09	03:09:32	24415	-36481	N	-a	-1.4725	0.1306	-0.8189	96.0	-	-
73	38	-0932	Jul 19	10:45:40	24098	-36258	Ne	-a	-1.5347	0.0182	-0.9350	36.2	-	-

SAROS SERIES

15

Saros series 15 contains 73 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-37	-2219 Apr 30	17:06:12	51950 -52179	Nb	a-	-1.5240	0.0518	-0.9288	63.5	-	-		
02	-36	-2201 May 12	00:10:45	51486 -51956	N	a-	-1.4436	0.1974	-0.7796	121.9	-	-		
03	-35	-2183 May 22	07:17:11	51025 -51733	N	a-	-1.3637	0.3424	-0.6315	157.8	-	-		
04	-34	-2165 Jun 02	14:27:01	50567 -51510	N	a-	-1.2856	0.4845	-0.4870	184.5	-	-		
05	-33	-2147 Jun 12	21:40:12	50110 -51287	N	a-	-1.2093	0.6237	-0.3460	205.8	-	-		
06	-32	-2129 Jun 24	04:59:49	49655 -51064	N	a-	-1.1373	0.7553	-0.2133	222.8	-	-		
07	-31	-2111 Jul 04	12:25:11	49202 -50841	N	a-	-1.0693	0.8798	-0.0882	236.7	-	-		
08	-30	-2093 Jul 15	19:59:27	48752 -50618	P	a-	-1.0077	0.9928	0.0249	247.7	34.9	-		
09	-29	-2075 Jul 26	03:40:26	48303 -50395	P	a-	-0.9509	1.0971	0.1288	256.9	78.2	-		
10	-28	-2057 Aug 06	11:32:01	47857 -50172	P	a-	-0.9025	1.1862	0.2172	263.9	100.1	-		
11	-27	-2039 Aug 16	19:31:49	47412 -49949	P	a-	-0.8605	1.2639	0.2939	269.5	114.9	-		
12	-26	-2021 Aug 28	03:41:54	46970 -49726	P	a-	-0.8264	1.3269	0.3558	273.7	125.0	-		
13	-25	-2003 Sep 07	12:00:10	46530 -49503	P	a-	-0.7988	1.3782	0.4059	276.9	132.2	-		

14	-24	-1985	Sep 18	20:27:52	46092	-49280	P	a-	-0.7787	1.4156	0.4422	279.0	137.0	-
15	-23	-1967	Sep 29	05:02:47	45655	-49057	P	a-	-0.7646	1.4420	0.4676	280.3	140.1	-
16	-22	-1949	Oct 10	13:44:03	45221	-48834	P	a-	-0.7556	1.4589	0.4838	281.0	142.0	-
17	-21	-1931	Oct 20	22:30:56	44790	-48611	P	a-	-0.7511	1.4673	0.4918	281.2	142.8	-
18	-20	-1913	Nov 01	07:21:56	44360	-48388	P	a-	-0.7498	1.4698	0.4944	281.1	143.0	-
19	-19	-1895	Nov 11	16:15:10	43932	-48165	P	a-	-0.7504	1.4684	0.4935	280.7	142.7	-
20	-18	-1877	Nov 23	01:08:26	43506	-47942	P	a-	-0.7508	1.4671	0.4931	280.3	142.6	-
21	-17	-1859	Dec 03	10:00:51	43082	-47719	P	a-	-0.7507	1.4667	0.4942	280.0	142.6	-
22	-16	-1841	Dec 14	18:50:51	42661	-47496	P	a-	-0.7482	1.4702	0.4996	280.0	143.2	-
23	-15	-1823	Dec 25	03:35:55	42241	-47273	P	a-	-0.7416	1.4812	0.5128	280.4	144.8	-
24	-14	-1804	Jan 05	12:15:52	41824	-47050	P	a-	-0.7307	1.5000	0.5341	281.3	147.2	-
25	-13	-1786	Jan 15	20:48:49	41408	-46827	P	a-	-0.7139	1.5295	0.5663	282.9	150.9	-
26	-12	-1768	Jan 27	05:14:46	40995	-46604	P	a-	-0.6914	1.5693	0.6090	285.0	155.4	-
27	-11	-1750	Feb 06	13:31:39	40584	-46381	P	a-	-0.6613	1.6232	0.6656	287.8	161.1	-
28	-10	-1732	Feb 17	21:40:58	40175	-46158	P	a-	-0.6249	1.6885	0.7336	291.1	167.3	-
29	-09	-1714	Feb 28	05:41:40	39768	-45935	P	a-	-0.5815	1.7670	0.8145	294.9	174.1	-
30	-08	-1696	Mar 10	13:33:53	39363	-45712	P	a-	-0.5311	1.8583	0.9080	298.9	181.0	-
31	-07	-1678	Mar 21	21:18:27	38960	-45489	T	a-	-0.4746	1.9611	1.0125	303.1	187.8	16.7
32	-06	-1660	Apr 01	04:56:16	38559	-45266	T	a-	-0.4128	2.0739	1.1265	307.1	194.2	51.3
33	-05	-1642	Apr 12	12:28:33	38160	-45043	T	p-	-0.3465	2.1953	1.2485	311.0	200.0	69.3
34	-04	-1624	Apr 22	19:54:17	37763	-44820	T	p-	-0.2750	2.3265	1.3797	314.5	205.0	82.0
35	-03	-1606	May 04	03:17:23	37369	-44597	T-	p-	-0.2018	2.4612	1.5137	317.4	208.9	90.8
36	-02	-1588	May 14	10:37:01	36976	-44374	T-	pp	-0.1261	2.6008	1.6520	319.8	211.8	96.6
37	-01	-1570	May 25	17:56:21	36585	-44151	T-	pp	-0.0505	2.7404	1.7896	321.5	213.5	99.7
38	00	-1552	Jun 05	01:14:16	36197	-43928	T+	pp	0.0258	2.7871	1.8337	322.6	214.1	100.2
39	01	-1534	Jun 16	08:35:13	35811	-43705	T+	pp	0.0990	2.6545	1.6977	323.0	213.5	98.2
40	02	-1516	Jun 26	15:57:57	35426	-43482	T+	-p	0.1700	2.5263	1.5655	322.9	211.9	93.9
41	03	-1498	Jul 07	23:24:30	35044	-43259	T+	-p	0.2370	2.4055	1.4402	322.3	209.4	87.2

42	04	-1480	Jul 18	06:55:31	34664	-43036	T	-p	0.2998	2.2930	1.3226	321.3	206.2	78.0
43	05	-1462	Jul 29	14:32:50	34286	-42813	T	-a	0.3562	2.1921	1.2163	320.1	202.5	66.3
44	06	-1444	Aug 08	22:16:31	33910	-42590	T	-a	0.4067	2.1024	1.1208	318.8	198.5	51.2
45	07	-1426	Aug 20	06:06:48	33536	-42367	T	-a	0.4507	2.0246	1.0370	317.6	194.4	29.1
46	08	-1408	Aug 30	14:04:44	33164	-42144	P	-a	0.4874	1.9603	0.9667	316.6	190.6	-
47	09	-1390	Sep 10	22:10:26	32794	-41921	P	-a	0.5169	1.9094	0.9096	316.0	187.3	-
48	10	-1372	Sep 21	06:22:44	32426	-41698	P	-a	0.5401	1.8697	0.8641	315.7	184.5	-
49	11	-1354	Oct 02	14:42:01	32061	-41475	P	-a	0.5567	1.8421	0.8308	315.9	182.5	-
50	12	-1336	Oct 12	23:06:50	31697	-41252	P	-a	0.5682	1.8237	0.8072	316.4	181.1	-
51	13	-1318	Oct 24	07:37:04	31336	-41029	P	-a	0.5743	1.8149	0.7935	317.3	180.4	-
52	14	-1300	Nov 03	16:09:07	30976	-40806	P	-a	0.5783	1.8097	0.7840	318.3	180.2	-
53	15	-1282	Nov 15	00:44:33	30619	-40583	P	-a	0.5790	1.8104	0.7810	319.6	180.4	-
54	16	-1264	Nov 25	09:19:01	30264	-40360	P	-a	0.5801	1.8098	0.7774	320.8	180.6	-
55	17	-1246	Dec 06	17:52:44	29910	-40137	P	-a	0.5811	1.8093	0.7744	321.9	180.9	-
56	18	-1228	Dec 17	02:21:11	29559	-39914	P	-a	0.5858	1.8015	0.7647	322.7	180.6	-
57	19	-1210	Dec 28	10:45:49	29210	-39691	P	-a	0.5930	1.7890	0.7510	323.1	179.9	-
58	20	-1191	Jan 07	19:02:47	28863	-39468	P	-a	0.6061	1.7654	0.7265	323.0	178.2	-
59	21	-1173	Jan 19	03:11:40	28518	-39245	P	-a	0.6249	1.7311	0.6917	322.3	175.5	-
60	22	-1155	Jan 29	11:10:40	28175	-39022	P	-a	0.6513	1.6829	0.6433	320.7	171.1	-
61	23	-1137	Feb 09	19:00:07	27835	-38799	P	-a	0.6844	1.6220	0.5824	318.2	165.0	-
62	24	-1119	Feb 20	02:38:37	27496	-38576	P	-h	0.7258	1.5461	0.5066	314.5	156.2	-
63	25	-1101	Mar 03	10:06:23	27159	-38353	P	-h	0.7751	1.4556	0.4162	309.4	144.1	-
64	26	-1083	Mar 13	17:23:33	26825	-38130	P	-t	0.8321	1.3510	0.3115	302.7	127.0	-
65	27	-1065	Mar 25	00:31:18	26492	-37907	P	-t	0.8957	1.2345	0.1947	294.1	102.5	-
66	28	-1047	Apr 04	07:28:45	26162	-37684	P	-t	0.9667	1.1045	0.0642	283.1	60.1	-
67	29	-1029	Apr 15	14:18:49	25833	-37461	N	-t	1.0425	0.9658	-0.0755	269.5	-	-
68	30	-1011	Apr 25	21:01:20	25507	-37238	N	-t	1.1232	0.8185	-0.2241	252.7	-	-
69	31	-0993	May 07	03:39:20	25183	-37015	N	-t	1.2066	0.6663	-0.3781	232.3	-	-

70	32	-0975	May 17	10:10:53	24861	-36792	N	-t	1.2939	0.5073	-0.5393	206.5	-	-
71	33	-0957	May 28	16:41:40	24541	-36569	N	-t	1.3804	0.3499	-0.6993	174.6	-	-
72	34	-0939	Jun 07	23:09:51	24223	-36346	N	-t	1.4674	0.1917	-0.8606	131.5	-	-
73	35	-0921	Jun 19	05:40:06	23907	-36123	Ne	-t	1.5516	0.0389	-1.0168	60.3	-	-

SAROS SERIES

16

Saros series 16 contains 73 lunar eclipses.

													PHASE	
													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE				MAG.	MAG.	m	m	
GREATEST														
ECLIPSE														
01	-37	-2172	Apr 21	16:21:06	50747	-51598	Nb	a-	1.5356	0.0206	-0.9406	39.2	-	-
02	-36	-2154	May 02	23:35:50	50290	-51375	N	a-	1.4688	0.1442	-0.8188	102.9	-	-
03	-35	-2136	May 13	06:47:27	49834	-51152	N	a-	1.3999	0.2719	-0.6938	140.1	-	-
04	-34	-2118	May 24	13:57:20	49381	-50929	N	a-	1.3303	0.4012	-0.5677	168.8	-	-
05	-33	-2100	Jun 03	21:07:46	48929	-50706	N	a-	1.2615	0.5295	-0.4434	192.3	-	-

06	-32	-2082	Jun 15	04:19:27	48480	-50483	N	h-	1.1940	0.6556	-0.3218	212.2	-	-
07	-31	-2064	Jun 25	11:33:22	48033	-50260	N	h-	1.1290	0.7775	-0.2050	229.3	-	-
08	-30	-2046	Jul 06	18:51:13	47587	-50037	N	h-	1.0677	0.8927	-0.0954	243.9	-	-
09	-29	-2028	Jul 17	02:14:16	47144	-49814	P	h-	1.0114	0.9991	0.0050	256.4	16.2	-
10	-28	-2010	Jul 28	09:43:42	46703	-49591	P	h-	0.9608	1.0951	0.0947	267.0	69.5	-
11	-27	-1992	Aug 07	17:18:34	46264	-49368	P	h-	0.9154	1.1818	0.1748	276.1	93.7	-
12	-26	-1974	Aug 19	01:01:49	45827	-49145	P	h-	0.8775	1.2546	0.2410	283.5	109.3	-
13	-25	-1956	Aug 29	08:51:57	45392	-48922	P	h-	0.8463	1.3153	0.2951	289.7	120.4	-
14	-24	-1938	Sep 09	16:49:58	44960	-48699	P	h-	0.8221	1.3630	0.3362	294.8	128.1	-
15	-23	-1920	Sep 20	00:53:59	44529	-48476	P	h-	0.8037	1.3999	0.3668	298.9	133.6	-
16	-22	-1902	Oct 01	09:05:16	44100	-48253	P	h-	0.7919	1.4245	0.3856	302.0	137.0	-
17	-21	-1884	Oct 11	17:21:36	43674	-48030	P	h-	0.7849	1.4400	0.3956	304.5	139.0	-
18	-20	-1866	Oct 23	01:41:56	43249	-47807	P	h-	0.7822	1.4475	0.3983	306.3	139.8	-
19	-19	-1848	Nov 02	10:05:23	42827	-47584	P	h-	0.7827	1.4488	0.3953	307.6	139.7	-
20	-18	-1830	Nov 13	18:29:55	42407	-47361	P	h-	0.7849	1.4464	0.3895	308.6	139.2	-
21	-17	-1812	Nov 24	02:53:47	41988	-47138	P	h-	0.7871	1.4438	0.3841	309.5	138.8	-
22	-16	-1794	Dec 05	11:14:06	41572	-46915	P	h-	0.7871	1.4449	0.3831	310.7	139.0	-
23	-15	-1776	Dec 15	19:31:04	41158	-46692	P	t-	0.7851	1.4493	0.3860	312.0	139.9	-
24	-14	-1758	Dec 27	03:41:34	40746	-46469	P	t-	0.7791	1.4608	0.3967	313.7	142.0	-
25	-13	-1739	Jan 06	11:44:12	40336	-46246	P	t-	0.7671	1.4828	0.4185	316.2	145.7	-
26	-12	-1721	Jan 17	19:37:38	39928	-46023	P	t-	0.7485	1.5169	0.4526	319.4	151.2	-
27	-11	-1703	Jan 28	03:21:17	39522	-45800	P	t-	0.7227	1.5640	0.5002	323.4	158.1	-
28	-10	-1685	Feb 08	10:54:45	39118	-45577	P	t-	0.6894	1.6247	0.5616	328.0	166.4	-
29	-09	-1667	Feb 18	18:16:25	38717	-45354	P	t-	0.6476	1.7011	0.6387	333.3	175.7	-
30	-08	-1649	Mar 02	01:27:51	38317	-45131	P	t-	0.5981	1.7915	0.7299	339.1	185.4	-
31	-07	-1631	Mar 12	08:28:31	37920	-44908	P	t-	0.5405	1.8970	0.8361	345.0	195.3	-
32	-06	-1613	Mar 23	15:19:42	37524	-44685	P	t-	0.4757	2.0155	0.9552	350.9	204.7	-
33	-05	-1595	Apr 02	22:01:42	37131	-44462	T	t-	0.4040	2.1470	1.0868	356.6	213.5	47.2

34	-04	-1577	Apr 14	04:36:26	36739	-44239	T	pp	0.3268	2.2886	1.2285	361.7	221.1	73.1
35	-03	-1559	Apr 24	11:05:02	36350	-44016	T+	pp	0.2451	2.4388	1.3782	366.0	227.3	89.2
36	-02	-1541	May 05	17:28:05	35963	-43793	T+	pp	0.1592	2.5967	1.5354	369.3	231.8	99.5
37	-01	-1523	May 15	23:48:50	35578	-43570	T+	pp	0.0718	2.7578	1.6953	371.6	234.6	105.1
38	00	-1505	May 27	06:07:39	35195	-43347	T-	pp	-0.0171	2.8588	1.7948	372.6	235.4	106.5
39	01	-1487	Jun 06	12:28:06	34814	-43124	T-	pp	-0.1043	2.7000	1.6339	372.5	234.4	103.7
40	02	-1469	Jun 17	18:48:43	34435	-42901	T-	pp	-0.1909	2.5422	1.4738	371.2	231.5	96.5
41	03	-1451	Jun 28	01:14:49	34058	-42678	T	pp	-0.2729	2.3931	1.3219	369.0	226.9	84.5
42	04	-1433	Jul 09	07:44:17	33683	-42455	T	-t	-0.3520	2.2495	1.1754	365.8	220.7	65.7
43	05	-1415	Jul 19	14:21:25	33311	-42232	T	-t	-0.4245	2.1180	1.0407	361.9	213.3	33.1
44	06	-1397	Jul 30	21:04:42	32940	-42009	P	-t	-0.4917	1.9964	0.9157	357.5	204.9	-
45	07	-1379	Aug 10	03:58:27	32571	-41786	P	-t	-0.5503	1.8906	0.8065	353.1	196.1	-
46	08	-1361	Aug 21	11:00:37	32205	-41563	P	-t	-0.6021	1.7973	0.7099	348.6	187.0	-
47	09	-1343	Aug 31	18:12:52	31841	-41340	P	-t	-0.6458	1.7187	0.6281	344.4	178.3	-
48	10	-1325	Sep 12	01:34:37	31478	-41117	P	-t	-0.6817	1.6542	0.5606	340.6	170.2	-
49	11	-1307	Sep 22	09:06:57	31118	-40894	P	-t	-0.7091	1.6053	0.5092	337.6	163.5	-
50	12	-1289	Oct 03	16:47:30	30760	-40671	P	-t	-0.7302	1.5675	0.4694	335.0	157.8	-
51	13	-1271	Oct 14	00:36:23	30404	-40448	P	-t	-0.7448	1.5415	0.4418	333.0	153.7	-
52	14	-1253	Oct 25	08:31:39	30050	-40225	P	-t	-0.7547	1.5237	0.4233	331.5	150.7	-
53	15	-1235	Nov 04	16:33:11	29698	-40002	P	-t	-0.7598	1.5144	0.4139	330.4	149.0	-
54	16	-1217	Nov 16	00:36:42	29348	-39779	P	-t	-0.7635	1.5073	0.4076	329.4	147.8	-
55	17	-1199	Nov 26	08:43:21	29000	-39556	P	-t	-0.7650	1.5038	0.4057	328.5	147.3	-
56	18	-1181	Dec 07	16:48:20	28654	-39333	P	-t	-0.7680	1.4970	0.4013	327.3	146.4	-
57	19	-1163	Dec 18	00:52:30	28310	-39110	P	-t	-0.7722	1.4877	0.3952	325.8	145.2	-
58	20	-1145	Dec 29	08:50:45	27969	-38887	P	-t	-0.7815	1.4686	0.3801	323.5	142.4	-
59	21	-1126	Jan 08	16:45:55	27629	-38664	P	-t	-0.7936	1.4440	0.3601	320.6	138.8	-
60	22	-1108	Jan 20	00:33:13	27292	-38441	P	-t	-0.8121	1.4076	0.3289	316.8	133.0	-
61	23	-1090	Jan 30	08:13:51	26956	-38218	P	-t	-0.8367	1.3595	0.2864	311.8	124.6	-

62	24	-1072	Feb 10	15:45:37	26623	-37995	P	-t	-0.8689	1.2974	0.2303	305.5	112.4	-
63	25	-1054	Feb 20	23:10:32	26292	-37772	P	-t	-0.9073	1.2238	0.1630	297.9	95.2	-
64	26	-1036	Mar 03	06:27:18	25963	-37549	P	-t	-0.9527	1.1374	0.0828	288.7	68.4	-
65	27	-1018	Mar 14	13:36:34	25636	-37326	Nx	-t	-1.0048	1.0387	-0.0096	277.6	-	-
66	28	-1000	Mar 24	20:39:25	25311	-37103	N	-t	-1.0626	0.9294	-0.1128	264.4	-	-
67	29	-0982	Apr 05	03:36:57	24988	-36880	N	-t	-1.1257	0.8108	-0.2256	248.8	-	-
68	30	-0964	Apr 15	10:29:50	24667	-36657	N	-t	-1.1930	0.6845	-0.3463	230.5	-	-
69	31	-0946	Apr 26	17:19:24	24348	-36434	N	-t	-1.2635	0.5524	-0.4732	208.8	-	-
70	32	-0928	May 07	00:07:15	24031	-36211	N	-t	-1.3361	0.4169	-0.6040	182.9	-	-
71	33	-0910	May 18	06:55:07	23717	-35988	N	-t	-1.4092	0.2805	-0.7362	151.3	-	-
72	34	-0892	May 28	13:43:13	23404	-35765	N	-t	-1.4828	0.1436	-0.8694	109.1	-	-
73	35	-0874	Jun 08	20:34:39	23093	-35542	Ne	-t	-1.5543	0.0110	-0.9990	30.4	-	-

SAROS SERIES

17

Saros series 17 contains 72 lunar eclipses.

PHASE

DURATIONS

SEQ. REL. CALENDAR TD ΔT LUNA ECL. QSE GAMMA PEN. UM. PEN. PAR. TOTAL

NUM.	NUM.	DATE	OF	s	NUM	TYPE	MAG.	MAG.	m	m	m	
GREATEST												
ECLIPSE												
01	-34	-2089 May 04 06:40:11	48657	-50571	Nb	t-	-1.5237	0.0965	-0.9718	96.0	-	-
02	-33	-2071 May 14 12:55:40	48209	-50348	N	t-	-1.4375	0.2546	-0.8134	153.7	-	-
03	-32	-2053 May 25 19:10:28	47763	-50125	N	t-	-1.3499	0.4154	-0.6530	193.5	-	-
04	-31	-2035 Jun 05 01:27:24	47319	-49902	N	t-	-1.2632	0.5748	-0.4942	224.2	-	-
05	-30	-2017 Jun 16 07:47:39	46877	-49679	N	t-	-1.1787	0.7305	-0.3395	248.8	-	-
06	-29	-1999 Jun 26 14:13:28	46437	-49456	N	t-	-1.0981	0.8791	-0.1922	268.8	-	-
07	-28	-1981 Jul 07 20:46:01	46000	-49233	Nx	t-	-1.0219	1.0195	-0.0534	285.2	-	-
08	-27	-1963 Jul 18 03:25:58	45564	-49010	P	t-	-0.9513	1.1501	0.0754	298.5	67.0	-
09	-26	-1945 Jul 29 10:15:45	45130	-48787	P	t-	-0.8880	1.2673	0.1906	309.2	104.7	-
10	-25	-1927 Aug 08 17:15:18	44699	-48564	P	t-	-0.8322	1.3706	0.2920	317.5	127.5	-
11	-24	-1909 Aug 20 00:24:50	44269	-48341	P	t-	-0.7839	1.4601	0.3796	324.1	143.2	-
12	-23	-1891 Aug 30 07:44:56	43842	-48118	P	t-	-0.7436	1.5350	0.4526	329.0	154.4	-
13	-22	-1873 Sep 10 15:15:52	43417	-47895	P	t-	-0.7113	1.5950	0.5111	332.6	162.2	-
14	-21	-1855 Sep 20 22:57:00	42993	-47672	P	t-	-0.6870	1.6402	0.5551	334.9	167.5	-
15	-20	-1837 Oct 02 06:46:28	42572	-47449	P	t-	-0.6687	1.6742	0.5884	336.4	171.2	-
16	-19	-1819 Oct 12 14:44:42	42153	-47226	P	t-	-0.6569	1.6959	0.6100	337.0	173.3	-
17	-18	-1801 Oct 23 22:49:56	41736	-47003	P	h-	-0.6499	1.7085	0.6232	336.9	174.5	-
18	-17	-1783 Nov 03 06:59:54	41321	-46780	P	h-	-0.6460	1.7149	0.6309	336.4	174.9	-
19	-16	-1765 Nov 14 15:12:57	40908	-46557	P	h-	-0.6439	1.7178	0.6358	335.6	175.0	-
20	-15	-1747 Nov 24 23:27:10	40498	-46334	P	h-	-0.6419	1.7200	0.6409	334.7	175.2	-
21	-14	-1729 Dec 06 07:41:29	40089	-46111	P	a-	-0.6393	1.7231	0.6475	333.7	175.5	-
22	-13	-1711 Dec 16 15:52:03	39682	-45888	P	a-	-0.6327	1.7329	0.6618	333.0	176.5	-
23	-12	-1693 Dec 27 23:59:54	39278	-45665	P	a-	-0.6230	1.7483	0.6821	332.5	178.1	-
24	-11	-1674 Jan 07 08:01:19	38875	-45442	P	a-	-0.6071	1.7746	0.7140	332.4	180.8	-
25	-10	-1656 Jan 18 15:56:49	38475	-45219	P	a-	-0.5856	1.8109	0.7563	332.8	184.2	-

26	-09	-1638	Jan 28	23:43:50	38076	-44996	P	a-	-0.5563	1.8615	0.8133	333.7	188.6	-
27	-08	-1620	Feb 09	07:24:41	37680	-44773	P	a-	-0.5209	1.9232	0.8817	334.8	193.5	-
28	-07	-1602	Feb 19	14:57:23	37286	-44550	P	a-	-0.4775	1.9993	0.9645	336.3	198.8	-
29	-06	-1584	Mar 01	22:22:28	36894	-44327	T	a-	-0.4268	2.0890	1.0609	337.9	204.1	38.5
30	-05	-1566	Mar 13	05:40:48	36503	-44104	T	a-	-0.3696	2.1906	1.1691	339.4	209.2	61.9
31	-04	-1548	Mar 23	12:53:35	36115	-43881	T	a-	-0.3066	2.3030	1.2879	340.6	213.7	77.3
32	-03	-1530	Apr 03	20:01:21	35729	-43658	T-	p-	-0.2382	2.4254	1.4163	341.5	217.4	88.5
33	-02	-1512	Apr 14	03:04:38	35346	-43435	T-	pp	-0.1649	2.5572	1.5536	341.8	220.1	96.3
34	-01	-1494	Apr 25	10:06:02	34964	-43212	T-	pp	-0.0888	2.6942	1.6958	341.4	221.6	100.9
35	00	-1476	May 05	17:06:09	34584	-42989	T-	pp	-0.0108	2.8350	1.8411	340.3	221.8	102.6
36	01	-1458	May 17	00:06:08	34206	-42766	T+	pp	0.0683	2.7275	1.7376	338.3	220.7	101.4
37	02	-1440	May 27	07:07:44	33831	-42543	T+	pp	0.1471	2.5812	1.5947	335.6	218.2	97.1
38	03	-1422	Jun 07	14:12:30	33457	-42320	T+	pp	0.2241	2.4386	1.4549	332.2	214.4	89.8
39	04	-1404	Jun 17	21:21:55	33086	-42097	T	-p	0.2980	2.3019	1.3204	328.1	209.5	79.0
40	05	-1386	Jun 29	04:35:26	32717	-41874	T	-p	0.3692	2.1703	1.1904	323.5	203.6	63.4
41	06	-1368	Jul 09	11:56:46	32349	-41651	T	-a	0.4346	2.0499	1.0710	318.6	197.0	40.1
42	07	-1350	Jul 20	19:24:37	31984	-41428	P	-a	0.4950	1.9387	0.9603	313.5	189.8	-
43	08	-1332	Jul 31	03:02:15	31621	-41205	P	-a	0.5483	1.8410	0.8627	308.5	182.5	-
44	09	-1314	Aug 11	10:47:10	31260	-40982	P	-a	0.5960	1.7534	0.7750	303.7	175.1	-
45	10	-1296	Aug 21	18:43:33	30901	-40759	P	-a	0.6350	1.6822	0.7033	299.4	168.3	-
46	11	-1278	Sep 02	02:48:11	30544	-40536	P	-a	0.6677	1.6224	0.6428	295.5	162.1	-
47	12	-1260	Sep 12	11:02:54	30189	-40313	P	-a	0.6929	1.5766	0.5964	292.3	156.9	-
48	13	-1242	Sep 23	19:25:35	29836	-40090	P	-a	0.7121	1.5417	0.5608	289.6	152.7	-
49	14	-1224	Oct 04	03:57:42	29486	-39867	P	-a	0.7244	1.5194	0.5380	287.7	149.8	-
50	15	-1206	Oct 15	12:35:58	29137	-39644	P	-a	0.7319	1.5058	0.5242	286.4	147.9	-
51	16	-1188	Oct 25	21:20:11	28790	-39421	P	-a	0.7351	1.4997	0.5182	285.5	146.9	-
52	17	-1170	Nov 06	06:08:24	28446	-39198	P	-a	0.7356	1.4987	0.5177	284.9	146.6	-
53	18	-1152	Nov 16	15:00:24	28103	-38975	P	-a	0.7336	1.5018	0.5217	284.6	146.9	-

54	19	-1134	Nov 27	23:52:07	27763	-38752	P	-a	0.7322	1.5037	0.5251	284.2	147.1	-
55	20	-1116	Dec 08	08:43:36	27425	-38529	P	-a	0.7313	1.5043	0.5276	283.8	147.2	-
56	21	-1098	Dec 19	17:31:58	27089	-38306	P	-a	0.7335	1.4991	0.5248	283.0	146.7	-
57	22	-1080	Dec 30	02:17:41	26754	-38083	P	-a	0.7382	1.4891	0.5175	281.9	145.7	-
58	23	-1061	Jan 10	10:56:25	26422	-37860	P	-a	0.7492	1.4674	0.4989	280.2	143.4	-
59	24	-1043	Jan 20	19:30:29	26092	-37637	P	-a	0.7644	1.4377	0.4725	277.9	140.0	-
60	25	-1025	Feb 01	03:56:03	25764	-37414	P	-a	0.7871	1.3943	0.4325	274.7	134.7	-
61	26	-1007	Feb 11	12:15:04	25439	-37191	P	-a	0.8155	1.3406	0.3823	270.7	127.6	-
62	27	-0989	Feb 22	20:24:37	25115	-36968	P	-a	0.8522	1.2716	0.3166	265.5	117.2	-
63	28	-0971	Mar 05	04:27:44	24793	-36745	P	-a	0.8943	1.1927	0.2408	259.2	103.3	-
64	29	-0953	Mar 16	12:22:24	24474	-36522	P	-a	0.9439	1.1002	0.1511	251.4	82.9	-
65	30	-0935	Mar 26	20:09:43	24156	-36299	P	-a	0.9996	0.9969	0.0502	241.9	48.5	-
66	31	-0917	Apr 07	03:50:22	23840	-36076	N	-a	1.0607	0.8838	-0.0610	230.5	-	-
67	32	-0899	Apr 17	11:25:33	23527	-35853	N	-a	1.1261	0.7630	-0.1803	216.9	-	-
68	33	-0881	Apr 28	18:55:48	23216	-35630	N	-a	1.1956	0.6351	-0.3075	200.6	-	-
69	34	-0863	May 09	02:21:39	22906	-35407	N	-a	1.2684	0.5016	-0.4409	180.8	-	-
70	35	-0845	May 20	09:45:40	22599	-35184	N	-a	1.3422	0.3663	-0.5767	156.7	-	-
71	36	-0827	May 30	17:08:14	22294	-34961	N	-a	1.4166	0.2305	-0.7137	126.1	-	-
72	37	-0809	Jun 11	00:30:48	21991	-34738	Ne	-a	1.4905	0.0959	-0.8503	82.5	-	-

SAROS SERIES

Saros series 18 contains 73 lunar eclipses.

PHASE													
DURATIONS													
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-37	-2078 Apr 02 14:19:28	48385 -50436	Nb	a-	1.5173	0.0652	-0.9176	71.1	-	-		
02	-36	-2060 Apr 12 21:33:45	47939 -50213	N	a-	1.4456	0.1941	-0.7837	120.8	-	-		
03	-35	-2042 Apr 24 04:44:09	47494 -49990	N	a-	1.3694	0.3317	-0.6417	155.2	-	-		
04	-34	-2024 May 04 11:55:20	47051 -49767	N	a-	1.2929	0.4702	-0.4993	181.7	-	-		
05	-33	-2006 May 15 19:04:52	46611 -49544	N	a-	1.2140	0.6134	-0.3529	203.9	-	-		
06	-32	-1988 May 26 02:18:15	46172 -49321	N	a-	1.1372	0.7530	-0.2107	222.0	-	-		
07	-31	-1970 Jun 06 09:32:50	45736 -49098	N	a-	1.0603	0.8931	-0.0688	237.5	-	-		
08	-30	-1952 Jun 16 16:52:31	45301 -48875	P	a-	0.9869	1.0272	0.0666	250.4	56.8	-		
09	-29	-1934 Jun 28 00:16:33	44869 -48652	P	a-	0.9163	1.1565	0.1964	261.2	95.6	-		
10	-28	-1916 Jul 08 07:48:07	44438 -48429	P	a-	0.8512	1.2758	0.3159	270.1	118.8	-		
11	-27	-1898 Jul 19 15:26:32	44010 -48206	P	a-	0.7913	1.3860	0.4256	277.4	135.4	-		
12	-26	-1880 Jul 29 23:12:52	43584 -47983	P	a-	0.7374	1.4853	0.5241	283.3	147.7	-		
13	-25	-1862 Aug 10 07:08:20	43160 -47760	P	a-	0.6905	1.5719	0.6095	287.9	156.9	-		
14	-24	-1844 Aug 20 15:12:24	42738 -47537	P	a-	0.6502	1.6467	0.6828	291.6	163.8	-		
15	-23	-1826 Aug 31 23:25:39	42318 -47314	P	a-	0.6173	1.7079	0.7424	294.4	168.9	-		
16	-22	-1808 Sep 11 07:47:16	41900 -47091	P	a-	0.5909	1.7571	0.7900	296.5	172.6	-		
17	-21	-1790 Sep 22 16:17:48	41485 -46868	P	a-	0.5716	1.7934	0.8246	297.9	175.1	-		

18	-20	-1772	Oct 03	00:55:31	41071	-46645	P	a-	0.5580	1.8191	0.8489	298.8	176.7	-
19	-19	-1754	Oct 14	09:39:21	40659	-46422	P	a-	0.5493	1.8356	0.8642	299.4	177.7	-
20	-18	-1736	Oct 24	18:28:29	40250	-46199	P	a-	0.5449	1.8441	0.8720	299.6	178.1	-
21	-17	-1718	Nov 05	03:21:21	39842	-45976	P	a-	0.5439	1.8461	0.8736	299.5	178.1	-
22	-16	-1700	Nov 15	12:15:37	39437	-45753	P	a-	0.5438	1.8462	0.8738	299.4	178.0	-
23	-15	-1682	Nov 26	21:09:36	39034	-45530	P	a-	0.5436	1.8463	0.8744	299.3	178.0	-
24	-14	-1664	Dec 07	06:02:00	38632	-45307	P	a-	0.5423	1.8481	0.8772	299.3	178.2	-
25	-13	-1646	Dec 18	14:51:43	38233	-45084	P	a-	0.5392	1.8532	0.8837	299.4	178.7	-
26	-12	-1628	Dec 28	23:35:40	37836	-44861	P	a-	0.5314	1.8666	0.8989	299.9	179.8	-
27	-11	-1609	Jan 09	08:14:15	37441	-44638	P	a-	0.5196	1.8873	0.9216	300.7	181.4	-
28	-10	-1591	Jan 19	16:44:55	37048	-44415	P	a-	0.5011	1.9200	0.9565	302.0	183.8	-
29	-09	-1573	Jan 31	01:09:05	36657	-44192	T	a-	0.4776	1.9620	1.0008	303.6	186.7	4.2
30	-08	-1555	Feb 10	09:23:13	36268	-43969	T	a-	0.4460	2.0188	1.0598	305.7	190.2	35.8
31	-07	-1537	Feb 21	17:30:36	35881	-43746	T	p-	0.4091	2.0855	1.1286	308.0	194.0	51.6
32	-06	-1519	Mar 04	01:28:24	35497	-43523	T	p-	0.3644	2.1666	1.2115	310.6	198.1	64.5
33	-05	-1501	Mar 15	09:18:51	35114	-43300	T	p-	0.3139	2.2587	1.3050	313.2	202.1	75.2
34	-04	-1483	Mar 25	17:00:38	34734	-43077	T+	p-	0.2561	2.3640	1.4114	315.9	205.9	84.3
35	-03	-1465	Apr 06	00:36:24	34355	-42854	T+	p-	0.1939	2.4780	1.5260	318.3	209.2	91.4
36	-02	-1447	Apr 16	08:05:43	33979	-42631	T+	pp	0.1266	2.6014	1.6493	320.3	211.8	96.5
37	-01	-1429	Apr 27	15:29:33	33604	-42408	T+	pp	0.0554	2.7325	1.7798	321.9	213.6	99.5
38	00	-1411	May 07	22:49:37	33232	-42185	T-	pp	-0.0186	2.8007	1.8466	323.0	214.3	100.3
39	01	-1393	May 19	06:07:12	32862	-41962	T-	pp	-0.0942	2.6629	1.7068	323.3	213.8	98.6
40	02	-1375	May 29	13:23:23	32494	-41739	T-	-p	-0.1702	2.5247	1.5661	323.0	212.2	94.1
41	03	-1357	Jun 09	20:38:58	32128	-41516	T-	-p	-0.2460	2.3873	1.4253	322.0	209.3	86.4
42	04	-1339	Jun 20	03:56:14	31764	-41293	T	-a	-0.3197	2.2542	1.2883	320.4	205.3	74.8
43	05	-1321	Jul 01	11:15:59	31402	-41070	T	-a	-0.3907	2.1262	1.1557	318.2	200.1	57.6
44	06	-1303	Jul 11	18:38:55	31042	-40847	T	-a	-0.4582	2.0047	1.0292	315.6	193.9	26.0
45	07	-1285	Jul 23	02:07:14	30684	-40624	P	-a	-0.5207	1.8929	0.9119	312.6	186.9	-

46	08	-1267	Aug 02	09:41:15	30329	-40401	P	-a	-0.5775	1.7917	0.8047	309.6	179.4	-
47	09	-1249	Aug 13	17:22:52	29975	-40178	P	-a	-0.6275	1.7031	0.7100	306.6	171.7	-
48	10	-1231	Aug 24	01:10:06	29624	-39955	P	-a	-0.6720	1.6245	0.6251	303.8	163.8	-
49	11	-1213	Sep 04	09:06:12	29274	-39732	P	-a	-0.7085	1.5607	0.5550	301.5	156.6	-
50	12	-1195	Sep 14	17:08:26	28927	-39509	P	-a	-0.7393	1.5074	0.4954	299.6	149.7	-
51	13	-1177	Sep 26	01:18:55	28582	-39286	P	-a	-0.7625	1.4680	0.4499	298.4	144.1	-
52	14	-1159	Oct 06	09:34:25	28238	-39063	P	-a	-0.7807	1.4375	0.4136	297.6	139.4	-
53	15	-1141	Oct 17	17:56:55	27897	-38840	P	-a	-0.7925	1.4186	0.3893	297.6	136.1	-
54	16	-1123	Oct 28	02:22:32	27558	-38617	P	-a	-0.8009	1.4055	0.3714	297.9	133.7	-
55	17	-1105	Nov 08	10:51:41	27221	-38394	P	-a	-0.8056	1.3991	0.3607	298.7	132.4	-
56	18	-1087	Nov 18	19:21:32	26886	-38171	P	-a	-0.8090	1.3947	0.3526	299.5	131.4	-
57	19	-1069	Nov 30	03:51:49	26553	-37948	P	-a	-0.8109	1.3927	0.3477	300.5	131.0	-
58	20	-1051	Dec 10	12:18:49	26222	-37725	P	-a	-0.8150	1.3863	0.3390	301.1	129.9	-
59	21	-1033	Dec 21	20:42:05	25894	-37502	P	-a	-0.8215	1.3753	0.3263	301.3	128.0	-
60	22	-1014	Jan 01	04:59:21	25567	-37279	P	-a	-0.8320	1.3566	0.3064	300.9	124.8	-
61	23	-0996	Jan 12	13:10:30	25242	-37056	P	-a	-0.8466	1.3302	0.2793	299.7	120.0	-
62	24	-0978	Jan 22	21:11:35	24920	-36833	P	-a	-0.8686	1.2899	0.2388	297.4	112.0	-
63	25	-0960	Feb 03	05:04:24	24599	-36610	P	-h	-0.8965	1.2386	0.1876	294.0	100.3	-
64	26	-0942	Feb 13	12:45:43	24281	-36387	P	-h	-0.9330	1.1715	0.1207	288.9	81.4	-
65	27	-0924	Feb 24	20:18:14	23965	-36164	P	-t	-0.9758	1.0930	0.0425	282.2	49.0	-
66	28	-0906	Mar 07	03:37:51	23650	-35941	N	-t	-1.0277	0.9975	-0.0527	273.1	-	-
67	29	-0888	Mar 17	10:49:04	23338	-35718	N	-t	-1.0855	0.8913	-0.1587	261.8	-	-
68	30	-0870	Mar 28	17:48:55	23028	-35495	N	-t	-1.1513	0.7706	-0.2795	247.1	-	-
69	31	-0852	Apr 08	00:40:39	22720	-35272	N	-t	-1.2226	0.6400	-0.4103	228.8	-	-
70	32	-0834	Apr 19	07:23:02	22414	-35049	N	-t	-1.3001	0.4981	-0.5528	205.2	-	-
71	33	-0816	Apr 29	13:59:50	22110	-34826	N	-t	-1.3808	0.3504	-0.7015	175.0	-	-
72	34	-0798	May 10	20:30:55	21809	-34603	N	-t	-1.4648	0.1969	-0.8564	133.4	-	-
73	35	-0780	May 21	02:57:48	21509	-34380	Ne	-t	-1.5509	0.0399	-1.0152	61.0	-	-

SAROS SERIES

19

Saros series 19 contains 73 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-37	-2031 Mar 24	13:27:27	47226 -49855	Nb	a-	-1.5260	0.0413	-0.9260	55.5	-	-		
02	-36	-2013 Apr 04	20:53:43	46784 -49632	N	a-	-1.4673	0.1494	-0.8185	104.9	-	-		
03	-35	-1995 Apr 15	04:12:15	46345 -49409	N	a-	-1.4029	0.2681	-0.7010	139.5	-	-		
04	-34	-1977 Apr 26	11:26:40	45907 -49186	N	a-	-1.3358	0.3921	-0.5788	167.3	-	-		
05	-33	-1959 May 06	18:36:13	45472 -48963	N	a-	-1.2657	0.5220	-0.4514	191.4	-	-		
06	-32	-1941 May 18	01:44:16	45039 -48740	N	h-	-1.1948	0.6538	-0.3227	212.3	-	-		
07	-31	-1923 May 28	08:48:40	44608 -48517	N	h-	-1.1217	0.7897	-0.1904	231.1	-	-		
08	-30	-1905 Jun 08	15:54:50	44179 -48294	N	h-	-1.0508	0.9220	-0.0625	247.4	-	-		
09	-29	-1887 Jun 18	23:01:01	43752 -48071	P	h-	-0.9809	1.0527	0.0632	261.9	57.0	-		

10	-28	-1869	Jun 30	06:11:04	43327	-47848	P	h-	-0.9149	1.1765	0.1817	274.4	95.3	-
11	-27	-1851	Jul 10	13:23:39	42904	-47625	P	h-	-0.8517	1.2955	0.2948	285.6	119.8	-
12	-26	-1833	Jul 21	20:43:12	42484	-47402	P	t-	-0.7949	1.4028	0.3959	295.0	137.2	-
13	-25	-1815	Aug 01	04:08:03	42065	-47179	P	t-	-0.7435	1.5005	0.4869	303.1	150.6	-
14	-24	-1797	Aug 12	11:39:35	41648	-46956	P	t-	-0.6985	1.5865	0.5662	310.1	160.9	-
15	-23	-1779	Aug 22	19:18:32	41234	-46733	P	t-	-0.6603	1.6600	0.6330	316.0	168.8	-
16	-22	-1761	Sep 03	03:05:25	40821	-46510	P	t-	-0.6295	1.7199	0.6862	320.8	174.8	-
17	-21	-1743	Sep 13	11:00:00	40411	-46287	P	t-	-0.6058	1.7667	0.7264	324.8	179.1	-
18	-20	-1725	Sep 24	19:00:40	40003	-46064	P	t-	-0.5880	1.8025	0.7560	328.2	182.3	-
19	-19	-1707	Oct 05	03:08:40	39597	-45841	P	t-	-0.5772	1.8252	0.7730	330.8	184.4	-
20	-18	-1689	Oct 16	11:21:25	39192	-45618	P	t-	-0.5709	1.8393	0.7819	332.9	185.6	-
21	-17	-1671	Oct 26	19:38:10	38790	-45395	P	t-	-0.5689	1.8454	0.7834	334.6	186.3	-
22	-16	-1653	Nov 07	03:56:46	38390	-45172	P	t-	-0.5690	1.8471	0.7811	336.0	186.6	-
23	-15	-1635	Nov 17	12:16:33	37992	-44949	P	t-	-0.5708	1.8455	0.7763	337.1	186.7	-
24	-14	-1617	Nov 28	20:34:34	37597	-44726	P	t-	-0.5719	1.8446	0.7730	338.2	186.9	-
25	-13	-1599	Dec 09	04:49:23	37203	-44503	P	t-	-0.5711	1.8471	0.7737	339.4	187.4	-
26	-12	-1581	Dec 20	12:59:37	36811	-44280	P	t-	-0.5670	1.8551	0.7807	340.7	188.5	-
27	-11	-1563	Dec 30	21:03:50	36421	-44057	P	t-	-0.5583	1.8713	0.7965	342.4	190.3	-
28	-10	-1544	Jan 11	04:59:08	36034	-43834	P	t-	-0.5430	1.8993	0.8247	344.6	193.2	-
29	-09	-1526	Jan 21	12:45:57	35648	-43611	P	t-	-0.5213	1.9389	0.8648	347.1	196.9	-
30	-08	-1508	Feb 01	20:22:22	35265	-43388	P	t-	-0.4915	1.9930	0.9198	350.2	201.5	-
31	-07	-1490	Feb 12	03:49:47	34884	-43165	P	t-	-0.4546	2.0601	0.9880	353.6	206.7	-
32	-06	-1472	Feb 23	11:04:22	34504	-42942	T	t-	-0.4079	2.1452	1.0744	357.3	212.5	43.7
33	-05	-1454	Mar 05	18:10:22	34127	-42719	T	p-	-0.3546	2.2425	1.1729	361.0	218.2	64.7
34	-04	-1436	Mar 16	01:04:18	33752	-42496	T	pp	-0.2921	2.3565	1.2881	364.6	223.7	80.3
35	-03	-1418	Mar 27	07:50:41	33379	-42273	T-	pp	-0.2238	2.4813	1.4140	367.8	228.5	91.9
36	-02	-1400	Apr 06	14:26:26	33008	-42050	T-	pp	-0.1471	2.6215	1.5550	370.5	232.3	100.3
37	-01	-1382	Apr 17	20:57:12	32639	-41827	T-	pp	-0.0668	2.7686	1.7026	372.3	234.7	105.2

38	00	-1364	Apr 28	03:20:47	32272	-41604	T+	pp	0.0187	2.8569	1.7910	373.0	235.5	106.4
39	01	-1346	May 09	09:41:00	31907	-41381	T+	pp	0.1067	2.6956	1.6295	372.6	234.4	103.6
40	02	-1328	May 19	15:58:04	31545	-41158	T+	pp	0.1968	2.5306	1.4639	371.0	231.3	95.9
41	03	-1310	May 30	22:15:34	31184	-40935	T	pt	0.2860	2.3673	1.2997	368.1	226.2	82.3
42	04	-1292	Jun 10	04:33:40	30825	-40712	T	-t	0.3747	2.2052	1.1361	363.9	218.8	58.8
43	05	-1274	Jun 21	10:54:18	30469	-40489	P	-t	0.4611	2.0476	0.9768	358.6	209.3	-
44	06	-1256	Jul 01	17:19:40	30115	-40266	P	-t	0.5433	1.8978	0.8250	352.3	197.7	-
45	07	-1238	Jul 12	23:51:12	29762	-40043	P	-t	0.6200	1.7582	0.6830	345.3	184.3	-
46	08	-1220	Jul 23	06:29:44	29412	-39820	P	-t	0.6911	1.6291	0.5514	337.8	169.2	-
47	09	-1202	Aug 03	13:16:41	29064	-39597	P	-t	0.7552	1.5128	0.4324	330.1	152.6	-
48	10	-1184	Aug 13	20:13:26	28718	-39374	P	-t	0.8114	1.4110	0.3279	322.6	135.0	-
49	11	-1166	Aug 25	03:20:15	28374	-39151	P	-t	0.8592	1.3246	0.2389	315.6	116.7	-
50	12	-1148	Sep 04	10:35:44	28032	-38928	P	-t	0.9000	1.2510	0.1628	309.1	97.3	-
51	13	-1130	Sep 15	18:02:24	27692	-38705	P	-t	0.9319	1.1937	0.1032	303.7	78.1	-
52	14	-1112	Sep 26	01:38:06	27354	-38482	P	-t	0.9567	1.1491	0.0568	299.2	58.2	-
53	15	-1094	Oct 07	09:23:47	27018	-38259	P	-t	0.9735	1.1188	0.0251	295.8	38.8	-
54	16	-1076	Oct 17	17:15:31	26684	-38036	P	-t	0.9858	1.0967	0.0022	293.2	11.5	-
55	17	-1058	Oct 29	01:15:45	26353	-37813	Nx	-t	0.9917	1.0860	-0.0086	291.6	-	-
56	18	-1040	Nov 08	09:19:55	26023	-37590	Nx	-t	0.9949	1.0798	-0.0141	290.5	-	-
57	19	-1022	Nov 19	17:27:58	25696	-37367	Nx	-t	0.9955	1.0779	-0.0145	289.6	-	-
58	20	-1004	Nov 30	01:36:37	25370	-37144	Nx	-t	0.9962	1.0756	-0.0147	288.7	-	-
59	21	-0986	Dec 11	09:45:47	25047	-36921	Nx	-t	0.9972	1.0721	-0.0151	287.5	-	-
60	22	-0968	Dec 21	17:52:05	24726	-36698	Nx	-t	1.0010	1.0633	-0.0202	285.7	-	-
61	23	-0949	Jan 02	01:54:36	24406	-36475	Nx	-t	1.0087	1.0469	-0.0321	283.0	-	-
62	24	-0931	Jan 12	09:52:05	24089	-36252	Nx	-t	1.0211	1.0215	-0.0524	279.2	-	-
63	25	-0913	Jan 23	17:43:31	23774	-36029	N	-t	1.0392	0.9854	-0.0828	274.2	-	-
64	26	-0895	Feb 03	01:26:45	23461	-35806	N	-t	1.0645	0.9361	-0.1261	267.5	-	-
65	27	-0877	Feb 14	09:02:46	23150	-35583	N	-t	1.0961	0.8749	-0.1809	259.2	-	-

01 -34 -1948 Apr 05 03:37:38 45210 -48828 N t- 1.5198 0.1056 -0.9667 100.5 - -

02	-33	-1930	Apr 16	10:00:50	44778	-48605	N	t-	1.4404	0.2505	-0.8199	152.6	-	-
03	-32	-1912	Apr 26	16:19:27	44348	-48382	N	t-	1.3567	0.4031	-0.6657	190.8	-	-
04	-31	-1894	May 07	22:35:43	43920	-48159	N	t-	1.2706	0.5607	-0.5070	221.6	-	-
05	-30	-1876	May 18	04:50:52	43495	-47936	N	t-	1.1826	0.7217	-0.3451	247.3	-	-
06	-29	-1858	May 29	11:07:47	43071	-47713	N	t-	1.0952	0.8818	-0.1847	268.7	-	-
07	-28	-1840	Jun 08	17:26:00	42649	-47490	Nx	t-	1.0079	1.0420	-0.0245	287.0	-	-
08	-27	-1822	Jun 19	23:49:58	42230	-47267	P	t-	0.9244	1.1955	0.1286	302.1	86.8	-
09	-26	-1804	Jun 30	06:19:06	41813	-47044	P	t-	0.8438	1.3437	0.2761	314.6	124.3	-
10	-25	-1786	Jul 11	12:57:00	41397	-46821	P	t-	0.7696	1.4804	0.4119	324.7	148.5	-
11	-24	-1768	Jul 21	19:42:06	40984	-46598	P	t-	0.7003	1.6081	0.5384	332.9	166.2	-
12	-23	-1750	Aug 02	02:38:15	40573	-46375	P	t-	0.6390	1.7213	0.6503	339.2	179.0	-
13	-22	-1732	Aug 12	09:43:34	40164	-46152	P	t-	0.5841	1.8227	0.7502	344.1	188.6	-
14	-21	-1714	Aug 23	16:59:56	39757	-45929	P	t-	0.5377	1.9086	0.8349	347.7	195.6	-
15	-20	-1696	Sep 03	00:26:30	39352	-45706	P	t-	0.4987	1.9807	0.9057	350.3	200.7	-
16	-19	-1678	Sep 14	08:04:12	38949	-45483	P	t-	0.4683	2.0370	0.9611	351.9	204.2	-
17	-18	-1660	Sep 24	15:51:52	38548	-45260	T	t-	0.4451	2.0798	1.0033	352.8	206.5	9.3
18	-17	-1642	Oct 05	23:47:30	38149	-45037	T	h-	0.4277	2.1118	1.0352	353.1	208.0	30.1
19	-16	-1624	Oct 16	07:51:51	37753	-44814	T	a-	0.4167	2.1317	1.0555	352.9	208.7	37.5
20	-15	-1606	Oct 27	16:02:01	37358	-44591	T	a-	0.4101	2.1433	1.0682	352.3	208.9	41.3
21	-14	-1588	Nov 07	00:17:20	36965	-44368	T	a-	0.4066	2.1488	1.0755	351.4	208.8	43.2
22	-13	-1570	Nov 18	08:34:21	36575	-44145	T	a-	0.4040	2.1524	1.0816	350.3	208.6	44.8
23	-12	-1552	Nov 28	16:53:31	36187	-43922	T	a-	0.4022	2.1541	1.0866	349.1	208.3	45.9
24	-11	-1534	Dec 10	01:11:25	35800	-43699	T	a-	0.3985	2.1587	1.0952	347.9	208.3	47.9
25	-10	-1516	Dec 20	09:26:54	35416	-43476	T	a-	0.3922	2.1679	1.1091	346.7	208.5	51.0
26	-09	-1498	Dec 31	17:38:01	35034	-43253	T	a-	0.3816	2.1849	1.1313	345.7	209.1	55.4
27	-08	-1479	Jan 11	01:44:18	34654	-43030	T	a-	0.3661	2.2102	1.1624	344.9	210.1	60.9
28	-07	-1461	Jan 22	09:43:29	34276	-42807	T	a-	0.3440	2.2476	1.2061	344.3	211.5	67.5
29	-06	-1443	Feb 01	17:35:40	33900	-42584	T	p-	0.3153	2.2970	1.2620	343.9	213.3	74.5

30	-05	-1425	Feb 13	01:20:22	33526	-42361	T	p-	0.2797	2.3590	1.3307	343.6	215.4	81.5
31	-04	-1407	Feb 23	08:58:18	33154	-42138	T+	p-	0.2378	2.4325	1.4109	343.3	217.4	87.9
32	-03	-1389	Mar 06	16:27:21	32784	-41915	T+	p-	0.1875	2.5214	1.5065	343.0	219.2	93.8
33	-02	-1371	Mar 16	23:50:58	32417	-41692	T+	pp	0.1319	2.6202	1.6118	342.4	220.7	98.3
34	-01	-1353	Mar 28	07:07:31	32051	-41469	T+	pp	0.0693	2.7319	1.7297	341.4	221.5	101.3
35	00	-1335	Apr 07	14:21:05	31688	-41246	T+	pp	0.0034	2.8499	1.8534	340.0	221.4	102.4
36	01	-1317	Apr 18	21:28:33	31326	-41023	T-	pp	-0.0685	2.7277	1.7367	337.9	220.3	101.2
37	02	-1299	Apr 29	04:36:07	30967	-40800	T-	pp	-0.1414	2.5915	1.6053	335.2	218.1	97.4
38	03	-1281	May 10	11:40:59	30609	-40577	T-	pp	-0.2179	2.4491	1.4671	331.7	214.5	90.5
39	04	-1263	May 20	18:47:46	30254	-40354	T	-p	-0.2935	2.3084	1.3300	327.5	209.7	79.9
40	05	-1245	Jun 01	01:54:31	29901	-40131	T	-p	-0.3702	2.1662	1.1909	322.6	203.4	63.5
41	06	-1227	Jun 11	09:06:01	29550	-39908	T	-a	-0.4439	2.0298	1.0569	317.0	196.0	36.0
42	07	-1209	Jun 22	16:20:50	29201	-39685	P	-a	-0.5156	1.8972	0.9261	310.9	187.3	-
43	08	-1191	Jul 02	23:41:28	28854	-39462	P	-a	-0.5834	1.7722	0.8022	304.4	177.6	-
44	09	-1173	Jul 14	07:08:15	28509	-39239	P	-a	-0.6469	1.6556	0.6862	297.7	167.0	-
45	10	-1155	Jul 24	14:43:07	28166	-39016	P	-a	-0.7043	1.5500	0.5808	291.0	155.9	-
46	11	-1137	Aug 04	22:26:00	27826	-38793	P	-a	-0.7557	1.4559	0.4864	284.5	144.4	-
47	12	-1119	Aug 15	06:17:14	27487	-38570	P	-a	-0.8007	1.3736	0.4034	278.4	132.8	-
48	13	-1101	Aug 26	14:17:42	27150	-38347	P	-a	-0.8389	1.3039	0.3329	272.9	121.7	-
49	14	-1083	Sep 05	22:27:19	26816	-38124	P	-a	-0.8703	1.2469	0.2749	268.1	111.2	-
50	15	-1065	Sep 17	06:45:25	26483	-37901	P	-a	-0.8951	1.2019	0.2287	264.1	102.0	-
51	16	-1047	Sep 27	15:12:18	26153	-37678	P	-a	-0.9134	1.1688	0.1947	261.0	94.3	-
52	17	-1029	Oct 08	23:46:52	25825	-37455	P	-a	-0.9259	1.1463	0.1713	258.7	88.6	-
53	18	-1011	Oct 19	08:28:43	25498	-37232	P	-a	-0.9331	1.1335	0.1579	257.3	85.1	-
54	19	-0993	Oct 30	17:14:48	25174	-37009	P	-a	-0.9375	1.1255	0.1496	256.3	82.9	-
55	20	-0975	Nov 10	02:05:51	24852	-36786	P	-a	-0.9383	1.1240	0.1483	255.9	82.4	-
56	21	-0957	Nov 21	10:58:45	24532	-36563	P	-a	-0.9377	1.1247	0.1496	255.6	82.7	-
57	22	-0939	Dec 01	19:52:36	24214	-36340	P	-a	-0.9370	1.1255	0.1514	255.4	83.1	-

58	23	-0921	Dec 13	04:44:21	23898	-36117	P	-a	-0.9383	1.1225	0.1499	254.9	82.6	-
59	24	-0903	Dec 23	13:34:06	23585	-35894	P	-a	-0.9414	1.1158	0.1451	254.0	81.3	-
60	25	-0884	Jan 03	22:19:25	23273	-35671	P	-a	-0.9483	1.1019	0.1335	252.6	78.1	-
61	26	-0866	Jan 14	06:58:44	22963	-35448	P	-a	-0.9602	1.0788	0.1130	250.3	72.0	-
62	27	-0848	Jan 25	15:31:28	22656	-35225	P	-a	-0.9776	1.0455	0.0824	247.2	61.8	-
63	28	-0830	Feb 04	23:56:43	22350	-35002	P	-a	-1.0012	1.0006	0.0405	242.8	43.6	-
64	29	-0812	Feb 16	08:14:04	22047	-34779	N	-a	-1.0314	0.9439	-0.0134	237.1	-	-
65	30	-0794	Feb 26	16:22:40	21745	-34556	N	-a	-1.0687	0.8740	-0.0806	229.8	-	-
66	31	-0776	Mar 09	00:23:47	21446	-34333	N	-a	-1.1122	0.7929	-0.1591	220.7	-	-
67	32	-0758	Mar 20	08:17:06	21149	-34110	N	-a	-1.1621	0.7003	-0.2495	209.5	-	-
68	33	-0740	Mar 30	16:02:13	20854	-33887	N	-a	-1.2187	0.5956	-0.3525	195.3	-	-
69	34	-0722	Apr 10	23:41:15	20561	-33664	N	-a	-1.2801	0.4822	-0.4647	177.8	-	-
70	35	-0704	Apr 21	07:14:14	20269	-33441	N	-a	-1.3465	0.3601	-0.5861	155.6	-	-
71	36	-0686	May 02	14:43:22	19981	-33218	N	-a	-1.4155	0.2333	-0.7127	126.9	-	-
72	37	-0668	May 12	22:07:14	19694	-32995	Ne	-a	-1.4885	0.0998	-0.8469	84.1	-	-

SAROS SERIES

21

Saros series 21 contains 74 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-38	-1955 Feb 22	03:20:00	45381 -48916	N	a-	-1.5328	0.0425	-0.9519	57.7	-	-		
02	-37	-1937 Mar 05	10:56:43	44948 -48693	N	a-	-1.4792	0.1377	-0.8505	102.6	-	-		
03	-36	-1919 Mar 15	18:28:43	44517 -48470	N	a-	-1.4210	0.2415	-0.7407	134.0	-	-		
04	-35	-1901 Mar 27	01:54:06	44089 -48247	N	a-	-1.3563	0.3575	-0.6192	160.6	-	-		
05	-34	-1883 Apr 06	09:14:50	43662 -48024	N	a-	-1.2868	0.4823	-0.4892	183.6	-	-		
06	-33	-1865 Apr 17	16:32:08	43238 -47801	N	a-	-1.2138	0.6141	-0.3529	203.7	-	-		
07	-32	-1847 Apr 27	23:47:34	42816 -47578	N	a-	-1.1383	0.7506	-0.2124	221.4	-	-		
08	-31	-1829 May 09	07:01:55	42395 -47355	N	a-	-1.0609	0.8910	-0.0687	236.9	-	-		
09	-30	-1811 May 19	14:16:11	41977 -47132	P	a-	-0.9823	1.0338	0.0767	250.5	60.8	-		
10	-29	-1793 May 30	21:32:54	41561 -46909	P	a-	-0.9050	1.1746	0.2195	262.2	100.6	-		
11	-28	-1775 Jun 10	04:52:44	41147 -46686	P	a-	-0.8297	1.3122	0.3584	272.1	125.7	-		
12	-27	-1757 Jun 21	12:16:23	40735 -46463	P	a-	-0.7570	1.4453	0.4921	280.5	144.1	-		
13	-26	-1739 Jul 01	19:45:44	40325 -46240	P	a-	-0.6884	1.5712	0.6181	287.5	158.0	-		
14	-25	-1721 Jul 13	03:21:41	39917 -46017	P	a-	-0.6249	1.6879	0.7343	293.3	168.7	-		
15	-24	-1703 Jul 23	11:05:03	39511 -45794	P	a-	-0.5673	1.7941	0.8394	297.9	176.9	-		
16	-23	-1685 Aug 03	18:55:11	39108 -45571	P	a-	-0.5152	1.8905	0.9344	301.6	183.3	-		
17	-22	-1667 Aug 14	02:54:28	38706 -45348	T	a-	-0.4707	1.9731	1.0151	304.5	188.0	18.3		
18	-21	-1649 Aug 25	11:01:55	38306 -45125	T	a-	-0.4330	2.0433	1.0833	306.7	191.6	42.0		
19	-20	-1631 Sep 04	19:18:21	37909 -44902	T	p-	-0.4025	2.1002	1.1381	308.4	194.1	53.2		
20	-19	-1613 Sep 16	03:42:35	37513 -44679	T	p-	-0.3786	2.1452	1.1809	309.6	195.9	59.9		
21	-18	-1595 Sep 26	12:15:20	37120 -44456	T	p-	-0.3618	2.1771	1.2108	310.5	197.1	64.0		

22	-17	-1577	Oct 07	20:55:00	36729	-44233	T	p-	-0.3506	2.1985	1.2303	311.1	197.8	66.4
23	-16	-1559	Oct 18	05:39:56	36340	-44010	T	p-	-0.3439	2.2117	1.2420	311.4	198.2	67.8
24	-15	-1541	Oct 29	14:30:16	35952	-43787	T	p-	-0.3415	2.2167	1.2457	311.6	198.3	68.2
25	-14	-1523	Nov 08	23:23:18	35567	-43564	T	p-	-0.3411	2.2179	1.2461	311.7	198.3	68.2
26	-13	-1505	Nov 20	08:18:21	35184	-43341	T	p-	-0.3426	2.2152	1.2430	311.7	198.2	67.9
27	-12	-1487	Nov 30	17:11:44	34804	-43118	T	p-	-0.3427	2.2151	1.2430	311.8	198.2	67.9
28	-11	-1469	Dec 12	02:04:27	34425	-42895	T	p-	-0.3424	2.2153	1.2438	311.9	198.4	68.0
29	-10	-1451	Dec 22	10:52:47	34048	-42672	T	p-	-0.3382	2.2225	1.2519	312.2	198.8	69.0
30	-09	-1432	Jan 02	19:36:18	33673	-42449	T	p-	-0.3304	2.2361	1.2669	312.7	199.6	70.8
31	-08	-1414	Jan 13	04:12:24	33301	-42226	T	p-	-0.3166	2.2607	1.2930	313.5	200.8	73.6
32	-07	-1396	Jan 24	12:41:54	32930	-42003	T	p-	-0.2976	2.2948	1.3287	314.5	202.3	77.1
33	-06	-1378	Feb 03	21:02:42	32561	-41780	T-	p-	-0.2716	2.3416	1.3773	315.7	204.2	81.3
34	-05	-1360	Feb 15	05:14:50	32195	-41557	T-	p-	-0.2385	2.4014	1.4388	317.1	206.3	85.9
35	-04	-1342	Feb 25	13:18:04	31831	-41334	T-	p-	-0.1983	2.4744	1.5133	318.7	208.5	90.4
36	-03	-1324	Mar 07	21:12:55	31468	-41111	T-	p-	-0.1515	2.5598	1.5999	320.3	210.6	94.4
37	-02	-1306	Mar 19	04:58:44	31108	-40888	T-	pp	-0.0974	2.6585	1.6995	321.7	212.4	97.7
38	-01	-1288	Mar 29	12:37:16	30750	-40665	T-	pp	-0.0375	2.7683	1.8097	322.9	213.7	99.7
39	00	-1270	Apr 09	20:08:29	30394	-40442	T+	pp	0.0280	2.7857	1.8271	323.7	214.3	100.1
40	01	-1252	Apr 20	03:34:47	30040	-40219	T+	pp	0.0974	2.6588	1.6995	323.9	213.9	98.4
41	02	-1234	May 01	10:54:14	29688	-39996	T+	-p	0.1718	2.5229	1.5624	323.5	212.3	94.0
42	03	-1216	May 11	18:11:44	29338	-39773	T+	-p	0.2471	2.3855	1.4231	322.4	209.5	86.3
43	04	-1198	May 23	01:25:00	28991	-39550	T	-a	0.3251	2.2437	1.2788	320.5	205.2	73.9
44	05	-1180	Jun 02	08:38:34	28645	-39327	T	-a	0.4023	2.1037	1.1356	317.7	199.4	54.1
45	06	-1162	Jun 13	15:49:47	28301	-39104	P	-a	0.4804	1.9623	0.9903	314.1	191.9	-
46	07	-1144	Jun 23	23:04:32	27960	-38881	P	-a	0.5546	1.8284	0.8520	309.9	182.9	-
47	08	-1126	Jul 05	06:20:12	27620	-38658	P	-a	0.6267	1.6985	0.7171	305.1	172.2	-
48	09	-1108	Jul 15	13:40:43	27283	-38435	P	-a	0.6938	1.5783	0.5914	299.8	160.1	-
49	10	-1090	Jul 26	21:05:03	26948	-38212	P	-a	0.7567	1.4658	0.4730	294.2	146.3	-

50	11	-1072	Aug 06	04:36:41	26614	-37989	P	-a	0.8126	1.3663	0.3674	288.7	131.4	-
51	12	-1054	Aug 17	12:13:58	26283	-37766	P	-a	0.8627	1.2777	0.2722	283.4	115.1	-
52	13	-1036	Aug 27	19:58:26	25954	-37543	P	-a	0.9060	1.2016	0.1896	278.5	97.5	-
53	14	-1018	Sep 08	03:50:12	25627	-37320	P	-a	0.9422	1.1385	0.1199	274.3	78.6	-
54	15	-1000	Sep 18	11:50:01	25302	-37097	P	-a	0.9711	1.0887	0.0637	271.0	57.9	-
55	16	-0982	Sep 29	19:56:29	24979	-36874	P	-a	0.9937	1.0502	0.0191	268.5	32.0	-
56	17	-0964	Oct 10	04:09:32	24658	-36651	Nx	-a	1.0103	1.0227	-0.0142	266.9	-	-
57	18	-0946	Oct 21	12:28:00	24339	-36428	Nx	-a	1.0216	1.0046	-0.0376	266.2	-	-
58	19	-0928	Oct 31	20:50:45	24023	-36205	N	-a	1.0288	0.9939	-0.0531	266.1	-	-
59	20	-0910	Nov 12	05:15:08	23708	-35982	N	-a	1.0337	0.9869	-0.0642	266.4	-	-
60	21	-0892	Nov 22	13:41:18	23396	-35759	N	-a	1.0367	0.9833	-0.0713	267.1	-	-
61	22	-0874	Dec 03	22:05:58	23085	-35536	N	-a	1.0402	0.9782	-0.0792	267.5	-	-
62	23	-0856	Dec 14	06:28:20	22777	-35313	N	-a	1.0448	0.9708	-0.0886	267.6	-	-
63	24	-0838	Dec 25	14:44:59	22470	-35090	N	-a	1.0532	0.9561	-0.1048	266.8	-	-
64	25	-0819	Jan 04	22:56:35	22166	-34867	N	-h	1.0650	0.9348	-0.1269	265.2	-	-
65	26	-0801	Jan 16	07:00:07	21864	-34644	N	-h	1.0829	0.9022	-0.1599	262.2	-	-
66	27	-0783	Jan 26	14:54:40	21564	-34421	N	-h	1.1073	0.8575	-0.2045	257.5	-	-
67	28	-0765	Feb 06	22:39:14	21266	-34198	N	-t	1.1389	0.7993	-0.2624	250.7	-	-
68	29	-0747	Feb 17	06:13:50	20970	-33975	N	-t	1.1778	0.7275	-0.3336	241.5	-	-
69	30	-0729	Feb 28	13:38:16	20676	-33752	N	-t	1.2243	0.6420	-0.4185	229.4	-	-
70	31	-0711	Mar 10	20:51:17	20384	-33529	N	-t	1.2791	0.5411	-0.5187	213.2	-	-
71	32	-0693	Mar 22	03:54:48	20094	-33306	N	-t	1.3406	0.4279	-0.6314	192.0	-	-
72	33	-0675	Apr 01	10:48:10	19807	-33083	N	-t	1.4091	0.3020	-0.7569	163.6	-	-
73	34	-0657	Apr 12	17:33:17	19521	-32860	N	-t	1.4831	0.1662	-0.8926	123.1	-	-
74	35	-0639	Apr 23	00:10:14	19238	-32637	Ne	-t	1.5626	0.0204	-1.0386	43.8	-	-

SAROS SERIES

22

Saros series 22 contains 74 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-38	-1926 Feb 02	17:47:59	44687 -48558	N	a-	1.5407	0.0197	-0.9580	38.4	-	-		
02	-37	-1908 Feb 14	01:51:59	44258 -48335	N	a-	1.5115	0.0728	-0.9042	73.6	-	-		
03	-36	-1890 Feb 24	09:45:03	43830 -48112	N	a-	1.4743	0.1409	-0.8356	102.0	-	-		
04	-35	-1872 Mar 06	17:30:33	43405 -47889	N	a-	1.4319	0.2186	-0.7576	126.5	-	-		
05	-34	-1854 Mar 18	01:05:07	42982 -47666	N	a-	1.3815	0.3111	-0.6653	150.1	-	-		
06	-33	-1836 Mar 28	08:33:32	42561 -47443	N	a-	1.3268	0.4117	-0.5652	171.6	-	-		
07	-32	-1818 Apr 08	15:53:11	42142 -47220	N	a-	1.2656	0.5245	-0.4535	192.3	-	-		
08	-31	-1800 Apr 18	23:07:28	41725 -46997	N	a-	1.2007	0.6444	-0.3352	211.4	-	-		
09	-30	-1782 Apr 30	06:15:29	41310 -46774	N	h-	1.1312	0.7731	-0.2088	229.4	-	-		
10	-29	-1764 May 10	13:20:30	40897 -46551	N	h-	1.0599	0.9053	-0.0794	245.9	-	-		
11	-28	-1746 May 21	20:22:41	40486 -46328	P	h-	0.9870	1.0409	0.0527	261.1	52.1	-		
12	-27	-1728 Jun 01	03:23:00	40078 -46105	P	t-	0.9133	1.1781	0.1859	274.8	96.5	-		
13	-26	-1710 Jun 12	10:23:58	39671 -45882	P	t-	0.8409	1.3135	0.3166	287.2	124.0	-		

14 -25 -1692 Jun 22 17:26:19 39267 -45659 P t- 0.7701 1.4460 0.4439 298.2 144.6 -

15 -24 -1674 Jul 04 00:31:48 38864 -45436 P t- 0.7028 1.5722 0.5645 307.8 160.5 -

16 -23 -1656 Jul 14 07:40:33 38464 -45213 P t- 0.6391 1.6922 0.6784 316.3 173.3 -

17 -22 -1638 Jul 25 14:55:15 38065 -44990 P t- 0.5811 1.8019 0.7817 323.6 183.4 -

18 -21 -1620 Aug 04 22:15:48 37669 -44767 P t- 0.5286 1.9016 0.8747 329.8 191.5 -

19 -20 -1602 Aug 16 05:42:53 37275 -44544 P t- 0.4822 1.9901 0.9565 335.2 197.9 -

20 -19 -1584 Aug 26 13:17:34 36883 -44321 T t- 0.4428 2.0657 1.0254 339.8 202.9 25.2

21 -18 -1566 Sep 06 21:00:26 36493 -44098 T p- 0.4112 2.1272 1.0802 343.7 206.7 44.1

22 -17 -1548 Sep 17 04:50:57 36105 -43875 T p- 0.3862 2.1762 1.1230 346.9 209.5 54.0

23 -16 -1530 Sep 28 12:47:59 35719 -43652 T p- 0.3672 2.2140 1.1547 349.7 211.7 60.0

24 -15 -1512 Oct 08 20:51:39 35335 -43429 T p- 0.3544 2.2403 1.1755 352.0 213.2 63.6

25 -14 -1494 Oct 20 05:00:46 34954 -43206 T p- 0.3467 2.2569 1.1871 353.9 214.3 65.5

26 -13 -1476 Oct 30 13:13:03 34574 -42983 T p- 0.3424 2.2670 1.1930 355.5 215.1 66.5

27 -12 -1458 Nov 10 21:27:54 34196 -42760 T p- 0.3409 2.2716 1.1940 356.9 215.6 66.8

28 -11 -1440 Nov 21 05:42:31 33821 -42537 T p- 0.3399 2.2748 1.1945 358.2 216.1 67.0

29 -10 -1422 Dec 02 13:56:30 33447 -42314 T p- 0.3390 2.2774 1.1951 359.3 216.7 67.2

30 -09 -1404 Dec 12 22:05:23 33076 -42091 T p- 0.3348 2.2858 1.2023 360.5 217.5 68.4

31 -08 -1386 Dec 24 06:10:50 32707 -41868 T p- 0.3284 2.2978 1.2138 361.7 218.5 70.2

32 -07 -1367 Jan 03 14:08:05 32339 -41645 T p- 0.3164 2.3198 1.2358 363.0 219.9 73.3

33 -06 -1349 Jan 14 21:58:10 31974 -41422 T p- 0.2988 2.3516 1.2684 364.5 221.7 77.5

34 -05 -1331 Jan 25 05:37:28 31611 -41199 T pp 0.2731 2.3984 1.3162 366.2 224.0 82.8

35 -04 -1313 Feb 05 13:08:38 31250 -40976 T+ pp 0.2413 2.4559 1.3752 367.9 226.5 88.4

36 -03 -1295 Feb 15 20:28:30 30891 -40753 T+ pp 0.2008 2.5293 1.4503 369.7 229.1 94.1

37 -02 -1277 Feb 27 03:38:12 30534 -40530 T+ pp 0.1525 2.6171 1.5399 371.4 231.6 99.3

38 -01 -1259 Mar 09 10:37:07 30180 -40307 T+ pp 0.0957 2.7203 1.6449 372.8 233.7 103.4

39 00 -1241 Mar 20 17:27:12 29827 -40084 T+ pp 0.0320 2.8364 1.7628 373.7 235.1 105.8

40 01 -1223 Mar 31 00:08:15 29476 -39861 T- pp -0.0388 2.8232 1.7512 373.9 235.3 105.9

41 02 -1205 Apr 11 06:41:26 29128 -39638 T- pp -0.1154 2.6817 1.6111 373.2 234.2 102.9

42	03	-1187	Apr 21	13:08:29	28781	-39415	T-	pp	-0.1970	2.5316	1.4621	371.4	231.3	95.8	
43	04	-1169	May 02	19:30:56	28437	-39192	T	pt	-0.2820	2.3752	1.3064	368.5	226.5	83.0	
44	05	-1151	May 13	01:48:56	28094	-38969	T	-t	-0.3704	2.2128	1.1445	364.1	219.3	60.4	
45	06	-1133	May 24	08:05:53	27754	-38746	P	-t	-0.4592	2.0498	0.9814	358.4	209.6	-	
46	07	-1115	Jun 03	14:22:11	27416	-38523	P	-t	-0.5485	1.8862	0.8175	351.3	197.1	-	
47	08	-1097	Jun 14	20:41:47	27080	-38300	P	-t	-0.6348	1.7281	0.6587	343.0	181.8	-	
48	09	-1079	Jun 25	03:02:41	26745	-38077	P	-t	-0.7200	1.5724	0.5019	333.4	162.7	-	
49	10	-1061	Jul 06	09:30:50	26413	-37854	P	-t	-0.7992	1.4277	0.3557	323.0	140.0	-	
50	11	-1043	Jul 16	16:04:05	26084	-37631	P	-t	-0.8746	1.2903	0.2167	311.8	111.5	-	
51	12	-1025	Jul 27	22:46:49	25756	-37408	P	-t	-0.9422	1.1672	0.0917	300.4	73.8	-	
52	13	-1007	Aug 07	05:36:31	25430	-37185	Nx	-t	-1.0043	1.0543	-0.0232	288.8	-	-	
53	14	-0989	Aug 18	12:38:00	25106	-36962	N	-t	-1.0573	0.9579	-0.1217	277.9	-	-	
54	15	-0971	Aug 28	19:48:31	24785	-36739	N	-t	-1.1035	0.8743	-0.2074	267.5	-	-	
55	16	-0953	Sep 09	03:09:53	24465	-36516	N	-t	-1.1414	0.8057	-0.2778	258.3	-	-	
56	17	-0935	Sep 19	10:41:00	24147	-36293	N	-t	-1.1718	0.7507	-0.3344	250.4	-	-	
57	18	-0917	Sep 30	18:23:02	23832	-36070	N	-t	-1.1935	0.7114	-0.3748	244.3	-	-	
58	19	-0899	Oct 11	02:13:31	23519	-35847	N	-t	-1.2093	0.6828	-0.4042	239.6	-	-	
59	20	-0881	Oct 22	10:11:12	23207	-35624	N	-t	-1.2198	0.6637	-0.4234	236.2	-	-	
60	21	-0863	Nov 01	18:15:33	22898	-35401	N	-t	-1.2253	0.6532	-0.4334	234.1	-	-	
61	22	-0845	Nov 13	02:24:54	22591	-35178	N	-t	-1.2272	0.6492	-0.4361	232.9	-	-	
62	23	-0827	Nov 23	10:36:37	22286	-34955	N	-t	-1.2277	0.6473	-0.4360	232.0	-	-	
63	24	-0809	Dec 04	18:49:35	21983	-34732	N	-t	-1.2274	0.6464	-0.4343	231.1	-	-	
64	25	-0791	Dec 15	03:01:46	21682	-34509	N	-t	-1.2285	0.6426	-0.4345	229.8	-	-	
65	26	-0773	Dec 26	11:12:04	21383	-34286	N	-t	-1.2316	0.6347	-0.4381	227.7	-	-	
66	27	-0754	Jan 05	19:17:23	21086	-34063	N	-t	-1.2393	0.6182	-0.4497	224.2	-	-	
67	28	-0736	Jan 17	03:18:32	20792	-33840	N	-t	-1.2509	0.5941	-0.4683	219.5	-	-	
68	29	-0718	Jan 27	11:12:53	20499	-33617	N	-t	-1.2683	0.5592	-0.4973	212.7	-	-	
69	30	-0700	Feb 07	19:00:18	20208	-33394	N	-t	-1.2921	0.5123	-0.5379	203.6	-	-	

70	31	-0682	Feb 18	02:39:50	19920	-33171	N	-t	-1.3229	0.4526	-0.5912	191.6	-	-
71	32	-0664	Feb 29	10:12:40	19634	-32948	N	-t	-1.3596	0.3819	-0.6552	176.3	-	-
72	33	-0646	Mar 11	17:38:09	19349	-32725	N	-t	-1.4027	0.2994	-0.7311	156.6	-	-
73	34	-0628	Mar 22	00:56:00	19067	-32502	N	-t	-1.4525	0.2048	-0.8192	130.0	-	-
74	35	-0610	Apr 02	08:08:34	18787	-32279	N	-t	-1.5071	0.1015	-0.9162	91.9	-	-

SAROS SERIES

23

Saros series 23 contains 73 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST ECLIPSE														
01	-34	-1825 Feb 25	16:58:50	42307	-47308	N	t-	-1.5387	0.0766	-1.0068	86.0	-	-	
02	-33	-1807 Mar 07	23:49:11	41889	-47085	N	t-	-1.4800	0.1827	-0.8975	131.5	-	-	
03	-32	-1789 Mar 19	06:32:35	41473	-46862	N	t-	-1.4150	0.3002	-0.7767	166.6	-	-	
04	-31	-1771 Mar 29	13:06:10	41060	-46639	N	t-	-1.3417	0.4333	-0.6406	197.5	-	-	

05 -30 -1753 Apr 09 19:35:43 40648 -46416 N t- -1.2645 0.5736 -0.4975 224.0 - -

06 -29 -1735 Apr 20 01:58:14 40239 -46193 N t- -1.1811 0.7253 -0.3433 247.8 - -

07 -28 -1717 May 01 08:19:01 39831 -45970 N t- -1.0955 0.8813 -0.1851 268.6 - -

08 -27 -1699 May 11 14:36:06 39426 -45747 Nx t- -1.0060 1.0446 -0.0201 287.0 - -

09 -26 -1681 May 22 20:55:07 39023 -45524 P t- -0.9173 1.2066 0.1435 302.6 91.4 -

10 -25 -1663 Jun 02 03:14:41 38622 -45301 P t- -0.8284 1.3692 0.3070 316.0 130.4 -

11 -24 -1645 Jun 13 09:37:51 38222 -45078 P t- -0.7416 1.5282 0.4666 327.2 156.6 -

12 -23 -1627 Jun 23 16:06:05 37825 -44855 P t- -0.6582 1.6812 0.6198 336.3 175.8 -

13 -22 -1609 Jul 04 22:40:59 37430 -44632 P t- -0.5795 1.8256 0.7641 343.5 190.1 -

14 -21 -1591 Jul 15 05:24:02 37037 -44409 P t- -0.5065 1.9598 0.8979 349.1 200.8 -

15 -20 -1573 Jul 26 12:15:10 36647 -44186 T t- -0.4392 2.0835 1.0210 353.4 208.8 23.6

16 -19 -1555 Aug 05 19:17:23 36258 -43963 T t- -0.3804 2.1920 1.1286 356.3 214.5 56.3

17 -18 -1537 Aug 17 02:29:32 35871 -43740 T t- -0.3289 2.2868 1.2226 358.3 218.5 71.5

18 -17 -1519 Aug 27 09:53:02 35487 -43517 T p- -0.2859 2.3663 1.3012 359.5 221.2 80.7

19 -16 -1501 Sep 07 17:26:56 35104 -43294 T- p- -0.2505 2.4315 1.3657 360.0 222.9 86.5

20 -15 -1483 Sep 18 01:12:25 34723 -43071 T- p- -0.2237 2.4809 1.4146 360.1 223.8 90.1

21 -14 -1465 Sep 29 09:07:03 34345 -42848 T- p- -0.2039 2.5173 1.4509 359.8 224.2 92.3

22 -13 -1447 Oct 09 17:10:08 33969 -42625 T- p- -0.1903 2.5421 1.4761 359.1 224.2 93.6

23 -12 -1429 Oct 21 01:20:42 33594 -42402 T- p- -0.1820 2.5568 1.4916 358.3 224.0 94.2

24 -11 -1411 Oct 31 09:37:50 33222 -42179 T- p- -0.1783 2.5629 1.4992 357.2 223.5 94.4

25 -10 -1393 Nov 11 17:58:21 32852 -41956 T- p- -0.1767 2.5647 1.5032 356.0 223.0 94.4

26 -09 -1375 Nov 22 02:21:21 32484 -41733 T- p- -0.1764 2.5638 1.5052 354.6 222.5 94.3

27 -08 -1357 Dec 03 10:44:35 32118 -41510 T- p- -0.1755 2.5637 1.5087 353.2 222.0 94.3

28 -07 -1339 Dec 13 19:07:44 31754 -41287 T- p- -0.1736 2.5650 1.5142 351.8 221.6 94.5

29 -06 -1321 Dec 25 03:26:11 31392 -41064 T- p- -0.1670 2.5747 1.5289 350.3 221.3 95.0

30 -05 -1302 Jan 04 11:42:00 31033 -40841 T- p- -0.1572 2.5900 1.5495 348.9 221.2 95.9

31 -04 -1284 Jan 15 19:50:45 30675 -40618 T- p- -0.1404 2.6176 1.5832 347.6 221.2 97.2

32 -03 -1266 Jan 26 03:54:43 30319 -40395 T- p- -0.1190 2.6538 1.6256 346.2 221.4 98.6

33	-02	-1248	Feb 06	11:49:34	29966	-40172	T-	pp	-0.0888	2.7059	1.6842	344.8	221.5	100.1
34	-01	-1230	Feb 16	19:39:20	29614	-39949	T-	pp	-0.0534	2.7675	1.7524	343.4	221.6	101.3
35	00	-1212	Feb 28	03:20:05	29265	-39726	T-	pp	-0.0095	2.8449	1.8364	341.8	221.4	101.9
36	01	-1194	Mar 10	10:54:44	28918	-39503	T+	pp	0.0405	2.7846	1.7827	339.9	220.7	101.5
37	02	-1176	Mar 20	18:21:43	28572	-39280	T+	pp	0.0977	2.6766	1.6808	337.6	219.3	99.6
38	03	-1158	Apr 01	01:44:23	28229	-39057	T+	pp	0.1593	2.5605	1.5707	334.7	217.0	95.8
39	04	-1140	Apr 11	09:01:41	27888	-38834	T+	pp	0.2264	2.4346	1.4503	331.3	213.7	89.2
40	05	-1122	Apr 22	16:15:22	27549	-38611	T	-p	0.2973	2.3019	1.3226	327.1	209.1	79.1
41	06	-1104	May 02	23:26:51	27212	-38388	T	-p	0.3708	2.1649	1.1900	322.1	203.2	63.3
42	07	-1086	May 14	06:37:19	26877	-38165	T	-a	0.4458	2.0254	1.0544	316.4	195.7	35.2
43	08	-1068	May 24	13:48:02	26544	-37942	P	-a	0.5212	1.8853	0.9175	309.8	186.6	-
44	09	-1050	Jun 04	21:00:16	26214	-37719	P	-a	0.5962	1.7464	0.7811	302.5	175.8	-
45	10	-1032	Jun 15	04:16:03	25885	-37496	P	-a	0.6690	1.6119	0.6485	294.6	163.2	-
46	11	-1014	Jun 26	11:36:32	25558	-37273	P	-a	0.7383	1.4841	0.5220	286.2	149.0	-
47	12	-0996	Jul 06	19:01:42	25234	-37050	P	-a	0.8044	1.3624	0.4010	277.4	132.7	-
48	13	-0978	Jul 18	02:34:21	24911	-36827	P	-a	0.8649	1.2513	0.2901	268.6	114.4	-
49	14	-0960	Jul 28	10:13:34	24591	-36604	P	-a	0.9205	1.1496	0.1879	259.8	93.3	-
50	15	-0942	Aug 08	18:01:57	24273	-36381	P	-a	0.9691	1.0608	0.0984	251.6	68.2	-
51	16	-0924	Aug 19	01:57:19	23956	-36158	P	-a	1.0124	0.9820	0.0184	243.7	29.8	-
52	17	-0906	Aug 30	10:02:56	23642	-35935	N	-a	1.0475	0.9181	-0.0468	236.9	-	-
53	18	-0888	Sep 09	18:16:20	23330	-35712	N	-a	1.0768	0.8651	-0.1013	230.9	-	-
54	19	-0870	Sep 21	02:39:04	23020	-35489	N	-a	1.0989	0.8253	-0.1425	226.2	-	-
55	20	-0852	Oct 01	11:09:09	22712	-35266	N	-a	1.1154	0.7958	-0.1736	222.6	-	-
56	21	-0834	Oct 12	19:47:07	22406	-35043	N	-a	1.1260	0.7770	-0.1936	220.2	-	-
57	22	-0816	Oct 23	04:30:47	22102	-34820	N	-a	1.1321	0.7663	-0.2054	218.8	-	-
58	23	-0798	Nov 03	13:18:53	21801	-34597	N	-a	1.1352	0.7610	-0.2113	218.0	-	-
59	24	-0780	Nov 13	22:10:51	21501	-34374	N	-a	1.1354	0.7607	-0.2119	217.8	-	-
60	25	-0762	Nov 25	07:04:43	21203	-34151	N	-a	1.1349	0.7615	-0.2108	217.8	-	-

61	26	-0744	Dec 05	15:58:42	20908	-33928	N	-a	1.1345	0.7620	-0.2097	217.8	-	-
62	27	-0726	Dec 17	00:50:34	20614	-33705	N	-a	1.1363	0.7582	-0.2124	217.2	-	-
63	28	-0708	Dec 27	09:39:42	20323	-33482	N	-a	1.1405	0.7496	-0.2196	216.1	-	-
64	29	-0689	Jan 07	18:24:31	20034	-33259	N	-a	1.1489	0.7333	-0.2339	214.0	-	-
65	30	-0671	Jan 18	03:02:42	19746	-33036	N	-a	1.1628	0.7067	-0.2585	210.6	-	-
66	31	-0653	Jan 29	11:34:26	19461	-32813	N	-a	1.1823	0.6698	-0.2931	205.8	-	-
67	32	-0635	Feb 08	19:58:04	19178	-32590	N	-a	1.2085	0.6206	-0.3400	199.1	-	-
68	33	-0617	Feb 20	04:14:04	18897	-32367	N	-a	1.2409	0.5599	-0.3984	190.3	-	-
69	34	-0599	Mar 02	12:20:32	18618	-32144	N	-a	1.2812	0.4850	-0.4712	178.5	-	-
70	35	-0581	Mar 13	20:19:31	18341	-31921	N	-a	1.3274	0.3991	-0.5551	163.4	-	-
71	36	-0563	Mar 24	04:10:03	18066	-31698	N	-a	1.3803	0.3013	-0.6514	143.4	-	-
72	37	-0545	Apr 04	11:52:54	17794	-31475	N	-a	1.4393	0.1925	-0.7590	115.9	-	-
73	38	-0527	Apr 14	19:28:57	17523	-31252	Ne	-a	1.5033	0.0747	-0.8762	73.1	-	-

SAROS SERIES

24

Saros series 24 contains 85 lunar eclipses.

PHASE

DURATIONS

SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-48	-2031 Sep 16	17:39:21	47214	-49849	N a-	1.5580	0.0204	-1.0217	41.9	-	-	
02	-47	-2013 Sep 28	01:47:32	46772	-49626	N a-	1.5373	0.0581	-0.9835	70.2	-	-	
03	-46	-1995 Oct 08	10:05:04	46333	-49403	N a-	1.5232	0.0836	-0.9571	83.8	-	-	
04	-45	-1977 Oct 19	18:28:40	45896	-49180	N a-	1.5134	0.1009	-0.9384	91.6	-	-	
05	-44	-1959 Oct 30	02:58:31	45461	-48957	N a-	1.5077	0.1103	-0.9270	95.4	-	-	
06	-43	-1941 Nov 10	11:29:55	45027	-48734	N a-	1.5025	0.1185	-0.9162	98.4	-	-	
07	-42	-1923 Nov 20	20:04:34	44597	-48511	N a-	1.4993	0.1227	-0.9088	99.7	-	-	
08	-41	-1905 Dec 02	04:38:02	44167	-48288	N a-	1.4949	0.1288	-0.8989	101.7	-	-	
09	-40	-1887 Dec 12	13:10:04	43741	-48065	N a-	1.4886	0.1382	-0.8851	104.8	-	-	
10	-39	-1869 Dec 23	21:37:30	43316	-47842	N a-	1.4782	0.1548	-0.8635	110.4	-	-	
11	-38	-1850 Jan 03	06:00:58	42893	-47619	N a-	1.4638	0.1784	-0.8344	117.7	-	-	
12	-37	-1832 Jan 14	14:18:16	42472	-47396	N a-	1.4439	0.2120	-0.7950	127.4	-	-	
13	-36	-1814 Jan 24	22:28:30	42054	-47173	N a-	1.4178	0.2569	-0.7441	139.1	-	-	
14	-35	-1796 Feb 05	06:31:39	41637	-46950	N a-	1.3853	0.3134	-0.6814	152.2	-	-	
15	-34	-1778 Feb 15	14:27:35	41223	-46727	N a-	1.3462	0.3820	-0.6066	166.2	-	-	
16	-33	-1760 Feb 26	22:15:48	40810	-46504	N a-	1.3002	0.4634	-0.5192	180.9	-	-	
17	-32	-1742 Mar 09	05:57:07	40400	-46281	N a-	1.2478	0.5567	-0.4201	195.7	-	-	
18	-31	-1724 Mar 19	13:32:13	39992	-46058	N a-	1.1895	0.6607	-0.3106	210.2	-	-	
19	-30	-1706 Mar 30	21:02:22	39586	-45835	N a-	1.1266	0.7737	-0.1926	224.1	-	-	
20	-29	-1688 Apr 10	04:26:27	39182	-45612	N a-	1.0578	0.8975	-0.0642	237.4	-	-	
21	-28	-1670 Apr 21	11:48:03	38780	-45389	P a-	0.9863	1.0268	0.0690	249.6	57.7	-	
22	-27	-1652 May 01	19:06:32	38380	-45166	P a-	0.9114	1.1626	0.2083	260.9	98.0	-	
23	-26	-1634 May 13	02:25:16	37982	-44943	P a-	0.8361	1.2993	0.3477	270.8	123.9	-	
24	-25	-1616 May 23	09:42:31	37586	-44720	P a-	0.7590	1.4399	0.4902	279.8	143.7	-	

25 -24 -1598 Jun 03 17:03:20 37192 -44497 P a- 0.6841 1.5765 0.6282 287.3 159.0 -
 26 -23 -1580 Jun 14 00:26:05 36801 -44274 P a- 0.6100 1.7122 0.7645 293.8 171.2 -
 27 -22 -1562 Jun 25 07:53:42 36411 -44051 P a- 0.5396 1.8414 0.8938 299.2 180.8 -
 28 -21 -1544 Jul 05 15:25:43 36023 -43828 T a- 0.4724 1.9651 1.0168 303.7 188.4 19.3
 29 -20 -1526 Jul 16 23:04:56 35638 -43605 T a- 0.4108 2.0787 1.1292 307.2 194.2 51.8
 30 -19 -1508 Jul 27 06:51:14 35255 -43382 T p- 0.3547 2.1825 1.2313 310.0 198.6 67.0
 31 -18 -1490 Aug 07 14:44:36 34873 -43159 T p- 0.3041 2.2762 1.3231 312.2 201.9 76.6
 32 -17 -1472 Aug 17 22:46:58 34494 -42936 T+ p- 0.2610 2.3567 1.4011 313.9 204.2 82.9
 33 -16 -1454 Aug 29 06:57:22 34117 -42713 T+ p- 0.2244 2.4250 1.4669 315.2 205.8 87.2
 34 -15 -1436 Sep 08 15:16:52 33742 -42490 T+ p- 0.1954 2.4796 1.5188 316.1 206.9 89.9
 35 -14 -1418 Sep 19 23:43:05 33369 -42267 T+ p- 0.1721 2.5238 1.5603 316.9 207.7 91.8
 36 -13 -1400 Sep 30 08:17:46 32998 -42044 T+ p- 0.1557 2.5552 1.5891 317.5 208.1 92.9
 37 -12 -1382 Oct 11 16:58:10 32629 -41821 T+ p- 0.1442 2.5775 1.6091 318.0 208.4 93.6
 38 -11 -1364 Oct 22 01:44:20 32262 -41598 T+ p- 0.1376 2.5905 1.6200 318.4 208.6 93.9
 39 -10 -1346 Nov 02 10:34:07 31898 -41375 T+ p- 0.1342 2.5976 1.6254 318.7 208.8 94.1
 40 -09 -1328 Nov 12 19:27:16 31535 -41152 T+ p- 0.1340 2.5987 1.6253 319.0 208.8 94.1
 41 -08 -1310 Nov 24 04:20:42 31174 -40929 T+ p- 0.1340 2.5991 1.6250 319.3 209.0 94.1
 42 -07 -1292 Dec 04 13:13:31 30816 -40706 T+ p- 0.1334 2.6003 1.6258 319.6 209.1 94.2
 43 -06 -1274 Dec 15 22:03:38 30459 -40483 T+ p- 0.1310 2.6046 1.6303 320.0 209.4 94.5
 44 -05 -1256 Dec 26 06:50:51 30105 -40260 T+ p- 0.1266 2.6124 1.6386 320.4 209.8 94.9
 45 -04 -1237 Jan 06 15:31:05 29753 -40037 T+ p- 0.1166 2.6304 1.6575 320.9 210.3 95.6
 46 -03 -1219 Jan 17 00:05:44 29402 -39814 T+ p- 0.1022 2.6563 1.6844 321.4 211.0 96.5
 47 -02 -1201 Jan 28 08:31:26 29054 -39591 T+ pp 0.0807 2.6952 1.7245 322.1 211.8 97.6
 48 -01 -1183 Feb 07 16:50:35 28708 -39368 T+ pp 0.0541 2.7432 1.7738 322.8 212.6 98.6
 49 00 -1165 Feb 19 00:58:18 28364 -39145 T+ pp 0.0187 2.8076 1.8393 323.5 213.3 99.4
 50 01 -1147 Mar 01 08:59:08 28022 -38922 T- pp -0.0219 2.8013 1.8340 324.1 213.8 99.6
 51 02 -1129 Mar 12 16:49:06 27682 -38699 T- pp -0.0711 2.7106 1.7440 324.5 213.8 98.9
 52 03 -1111 Mar 23 00:32:13 27345 -38476 T- p- -0.1254 2.6107 1.6446 324.5 213.2 96.7

53	04	-1093	Apr 03	08:05:23	27009	-38253	T-	-p	-0.1874	2.4970	1.5307	324.0	211.8	92.4	
54	05	-1075	Apr 13	15:33:30	26675	-38030	T-	-p	-0.2529	2.3771	1.4103	323.0	209.3	85.4	
55	06	-1057	Apr 24	22:54:00	26344	-37807	T	-a	-0.3242	2.2470	1.2790	321.1	205.4	74.0	
56	07	-1039	May 05	06:09:53	26014	-37584	T	-a	-0.3985	2.1116	1.1418	318.5	199.9	55.3	
57	08	-1021	May 16	13:21:16	25687	-37361	P	-a	-0.4758	1.9708	0.9986	314.8	192.6	-	
58	09	-1003	May 26	20:31:01	25362	-37138	P	-a	-0.5539	1.8291	0.8539	310.3	183.3	-	
59	10	-0985	Jun 07	03:39:17	25038	-36915	P	-a	-0.6322	1.6872	0.7084	304.7	171.6	-	
60	11	-0967	Jun 17	10:47:18	24717	-36692	P	-a	-0.7098	1.5470	0.5639	298.1	157.3	-	
61	12	-0949	Jun 28	17:57:27	24398	-36469	P	-a	-0.7847	1.4119	0.4240	290.7	139.8	-	
62	13	-0931	Jul 09	01:10:17	24081	-36246	P	-a	-0.8567	1.2826	0.2893	282.5	118.2	-	
63	14	-0913	Jul 20	08:26:35	23766	-36023	P	-a	-0.9246	1.1608	0.1618	273.8	90.3	-	
64	15	-0895	Jul 30	15:47:51	23453	-35800	P	-a	-0.9875	1.0487	0.0434	264.7	47.7	-	
65	16	-0877	Aug 10	23:15:17	23142	-35577	N	-a	-1.0441	0.9480	-0.0637	255.6	-	-	
66	17	-0859	Aug 21	06:49:47	22833	-35354	N	-a	-1.0941	0.8595	-0.1588	246.8	-	-	
67	18	-0841	Sep 01	14:30:07	22527	-35131	N	-a	-1.1385	0.7815	-0.2435	238.4	-	-	
68	19	-0823	Sep 11	22:18:59	22222	-34908	N	-a	-1.1749	0.7180	-0.3135	231.1	-	-	
69	20	-0805	Sep 23	06:14:50	21919	-34685	N	-a	-1.2045	0.6669	-0.3711	224.9	-	-	
70	21	-0787	Oct 03	14:18:01	21619	-34462	N	-a	-1.2276	0.6275	-0.4165	219.9	-	-	
71	22	-0769	Oct 14	22:26:25	21320	-34239	N	-a	-1.2456	0.5974	-0.4524	216.2	-	-	
72	23	-0751	Oct 25	06:40:49	21024	-34016	N	-a	-1.2582	0.5769	-0.4780	213.7	-	-	
73	24	-0733	Nov 05	14:58:51	20730	-33793	N	-a	-1.2671	0.5629	-0.4966	212.3	-	-	
74	25	-0715	Nov 15	23:18:54	20438	-33570	N	-a	-1.2735	0.5531	-0.5102	211.4	-	-	
75	26	-0697	Nov 27	07:40:04	20147	-33347	N	-a	-1.2783	0.5459	-0.5207	210.9	-	-	
76	27	-0679	Dec 07	15:59:46	19859	-33124	N	-a	-1.2834	0.5378	-0.5312	210.2	-	-	
77	28	-0661	Dec 19	00:16:45	19573	-32901	N	-h	-1.2902	0.5263	-0.5445	208.8	-	-	
78	29	-0643	Dec 29	08:27:48	19289	-32678	N	-h	-1.3009	0.5071	-0.5647	205.9	-	-	
79	30	-0624	Jan 09	16:33:32	19008	-32455	N	-h	-1.3150	0.4815	-0.5908	201.7	-	-	
80	31	-0606	Jan 20	00:30:56	18728	-32232	N	-t	-1.3345	0.4456	-0.6266	195.1	-	-	

81	32	-0588	Jan 31	08:19:04	18450	-32009	N	-t	-1.3608	0.3971	-0.6747	185.5	-	-
82	33	-0570	Feb 10	15:57:04	18175	-31786	N	-t	-1.3943	0.3353	-0.7357	171.8	-	-
83	34	-0552	Feb 21	23:24:53	17901	-31563	N	-t	-1.4350	0.2601	-0.8100	152.7	-	-
84	35	-0534	Mar 04	06:42:30	17630	-31340	N	-t	-1.4829	0.1718	-0.8972	125.3	-	-
85	36	-0516	Mar 14	13:48:42	17360	-31117	Ne	-t	-1.5386	0.0690	-0.9989	80.3	-	-

SAROS SERIES

25

Saros series 25 contains 87 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST ECLIPSE														
01	-51	-2038 Aug 06	11:54:00	47388	-49937	Nb a-	-1.5302	0.0269	-0.9270	43.7	-	-		
02	-50	-2020 Aug 16	19:58:52	46946	-49714	N a-	-1.4934	0.0963	-0.8613	82.4	-	-		
03	-49	-2002 Aug 28	04:11:11	46506	-49491	N a-	-1.4630	0.1540	-0.8075	103.8	-	-		
04	-48	-1984 Sep 07	12:31:19	46068	-49268	N a-	-1.4394	0.1994	-0.7660	117.9	-	-		

05	-47	-1966	Sep 18	20:59:01	45632	-49045	N	a-	-1.4224	0.2325	-0.7368	127.1	-	-
06	-46	-1948	Sep 29	05:34:07	45198	-48822	N	a-	-1.4118	0.2538	-0.7192	132.8	-	-
07	-45	-1930	Oct 10	14:14:24	44766	-48599	N	a-	-1.4059	0.2663	-0.7100	136.2	-	-
08	-44	-1912	Oct 20	22:59:59	44337	-48376	N	a-	-1.4048	0.2699	-0.7095	137.3	-	-
09	-43	-1894	Nov 01	07:48:24	43909	-48153	N	a-	-1.4064	0.2682	-0.7138	137.2	-	-
10	-42	-1876	Nov 11	16:39:15	43483	-47930	N	a-	-1.4107	0.2615	-0.7227	135.8	-	-
11	-41	-1858	Nov 23	01:28:40	43060	-47707	N	a-	-1.4143	0.2556	-0.7302	134.7	-	-
12	-40	-1840	Dec 03	10:17:51	42638	-47484	N	a-	-1.4183	0.2489	-0.7380	133.3	-	-
13	-39	-1822	Dec 14	19:02:39	42219	-47261	N	a-	-1.4190	0.2479	-0.7397	133.3	-	-
14	-38	-1804	Dec 25	03:43:16	41801	-47038	N	a-	-1.4172	0.2514	-0.7365	134.5	-	-
15	-37	-1785	Jan 05	12:16:15	41386	-46815	N	a-	-1.4098	0.2650	-0.7229	138.2	-	-
16	-36	-1767	Jan 15	20:42:47	40973	-46592	N	a-	-1.3980	0.2865	-0.7011	143.8	-	-
17	-35	-1749	Jan 27	05:00:17	40562	-46369	N	a-	-1.3793	0.3206	-0.6666	152.0	-	-
18	-34	-1731	Feb 06	13:08:18	40153	-46146	N	a-	-1.3539	0.3670	-0.6198	162.3	-	-
19	-33	-1713	Feb 17	21:06:34	39746	-45923	N	a-	-1.3213	0.4266	-0.5599	174.5	-	-
20	-32	-1695	Feb 28	04:55:17	39341	-45700	N	a-	-1.2819	0.4988	-0.4874	188.0	-	-
21	-31	-1677	Mar 11	12:34:35	38938	-45477	N	a-	-1.2355	0.5839	-0.4024	202.4	-	-
22	-30	-1659	Mar 21	20:04:12	38537	-45254	N	a-	-1.1821	0.6822	-0.3046	217.3	-	-
23	-29	-1641	Apr 02	03:25:44	38138	-45031	N	h-	-1.1229	0.7914	-0.1964	232.4	-	-
24	-28	-1623	Apr 12	10:39:36	37742	-44808	N	h-	-1.0583	0.9107	-0.0785	247.1	-	-
25	-27	-1605	Apr 23	17:46:41	37347	-44585	P	h-	-0.9888	1.0391	0.0479	261.4	49.8	-
26	-26	-1587	May 04	00:48:42	36955	-44362	P	t-	-0.9158	1.1743	0.1806	275.0	95.3	-
27	-25	-1569	May 15	07:46:57	36564	-44139	P	t-	-0.8407	1.3137	0.3169	287.6	124.2	-
28	-24	-1551	May 25	14:43:20	36176	-43916	P	t-	-0.7646	1.4551	0.4546	299.1	146.3	-
29	-23	-1533	Jun 05	21:37:35	35790	-43693	P	t-	-0.6877	1.5986	0.5938	309.7	164.1	-
30	-22	-1515	Jun 16	04:33:31	35406	-43470	P	t-	-0.6129	1.7381	0.7285	318.9	178.4	-
31	-21	-1497	Jun 27	11:30:20	35024	-43247	P	t-	-0.5400	1.8747	0.8597	327.1	190.2	-
32	-20	-1479	Jul 07	18:31:17	34644	-43024	P	t-	-0.4710	2.0041	0.9835	334.1	199.5	-

33 -19 -1461 Jul 19 01:35:19 34266 -42801 T t- -0.4056 2.1272 1.1004 340.3 207.1 49.0

34 -18 -1443 Jul 29 08:46:13 33890 -42578 T p- -0.3468 2.2384 1.2052 345.4 212.9 67.9

35 -17 -1425 Aug 09 16:02:54 33516 -42355 T p- -0.2939 2.3387 1.2989 349.8 217.4 79.4

36 -16 -1407 Aug 19 23:26:30 33144 -42132 T- pp -0.2477 2.4268 1.3804 353.4 220.9 87.0

37 -15 -1389 Aug 31 06:57:59 32774 -41909 T- pp -0.2089 2.5014 1.4484 356.6 223.4 92.1

38 -14 -1371 Sep 10 14:37:09 32407 -41686 T- pp -0.1772 2.5628 1.5034 359.2 225.3 95.4

39 -13 -1353 Sep 21 22:24:14 32041 -41463 T- pp -0.1531 2.6102 1.5446 361.5 226.6 97.5

40 -12 -1335 Oct 02 06:16:58 31678 -41240 T- pp -0.1343 2.6475 1.5763 363.5 227.7 99.0

41 -11 -1317 Oct 13 14:17:10 31316 -41017 T- pp -0.1225 2.6718 1.5954 365.3 228.5 99.8

42 -10 -1299 Oct 23 22:21:41 30957 -40794 T- pp -0.1146 2.6884 1.6075 366.8 229.1 100.3

43 -09 -1281 Nov 04 06:30:30 30600 -40571 T- pp -0.1110 2.6970 1.6124 368.1 229.6 100.6

44 -08 -1263 Nov 14 14:40:25 30245 -40348 T- pp -0.1086 2.7029 1.6152 369.3 230.1 100.8

45 -07 -1245 Nov 25 22:51:36 29892 -40125 T- pp -0.1078 2.7055 1.6156 370.4 230.5 100.9

46 -06 -1227 Dec 06 07:00:14 29540 -39902 T- pp -0.1053 2.7108 1.6195 371.3 231.0 101.2

47 -05 -1209 Dec 17 15:05:33 29191 -39679 T- pp -0.1006 2.7198 1.6279 372.2 231.5 101.6

48 -04 -1191 Dec 27 23:05:11 28845 -39456 T- pp -0.0914 2.7366 1.6447 373.0 232.2 102.3

49 -03 -1172 Jan 08 06:58:38 28500 -39233 T- pp -0.0776 2.7617 1.6704 373.7 232.8 103.1

50 -02 -1154 Jan 18 14:42:39 28157 -39010 T- pp -0.0564 2.7998 1.7098 374.3 233.6 104.1

51 -01 -1136 Jan 29 22:18:07 27816 -38787 T- pp -0.0287 2.8497 1.7615 374.8 234.2 105.0

52 00 -1118 Feb 09 05:42:52 27478 -38564 T+ pp 0.0074 2.8879 1.8018 375.1 234.7 105.4

53 01 -1100 Feb 20 12:58:55 27141 -38341 T+ pp 0.0505 2.8077 1.7238 375.1 234.8 105.0

54 02 -1082 Mar 02 20:02:19 26807 -38118 T+ pp 0.1035 2.7091 1.6277 374.6 234.1 103.0

55 03 -1064 Mar 13 02:57:59 26474 -37895 T+ pp 0.1625 2.5996 1.5206 373.4 232.5 98.8

56 04 -1046 Mar 24 09:42:42 26144 -37672 T+ pp 0.2302 2.4742 1.3977 371.4 229.4 91.1

57 05 -1028 Apr 03 16:21:38 25816 -37449 T pt 0.3025 2.3403 1.2660 368.3 224.8 78.4

58 06 -1010 Apr 14 22:50:51 25490 -37226 T -t 0.3826 2.1924 1.1200 364.0 218.0 55.4

59 07 -0992 Apr 25 05:16:54 25165 -37003 P -t 0.4653 2.0398 0.9692 358.3 208.8 -

60 08 -0974 May 06 11:36:49 24844 -36780 P -t 0.5525 1.8792 0.8099 351.0 196.4 -

61	09	-0956	May 16	17:55:51	24524	-36557	P	-t	0.6404	1.7173	0.6491	342.3	180.7	-
62	10	-0938	May 28	00:12:24	24206	-36334	P	-t	0.7302	1.5522	0.4847	331.7	160.3	-
63	11	-0920	Jun 07	06:31:43	23890	-36111	P	-t	0.8174	1.3919	0.3247	319.8	134.4	-
64	12	-0902	Jun 18	12:52:50	23576	-35888	P	-t	0.9031	1.2348	0.1674	306.3	98.6	-
65	13	-0884	Jun 28	19:18:19	23264	-35665	P	-t	0.9852	1.0845	0.0166	291.4	31.7	-
66	14	-0866	Jul 10	01:49:18	22955	-35442	N	-t	1.0625	0.9430	-0.1257	275.5	-	-
67	15	-0848	Jul 20	08:27:33	22647	-35219	N	-t	1.1338	0.8128	-0.2570	258.9	-	-
68	16	-0830	Jul 31	15:14:16	22342	-34996	N	-t	1.1985	0.6947	-0.3764	241.9	-	-
69	17	-0812	Aug 10	22:09:43	22039	-34773	N	-t	1.2561	0.5896	-0.4829	224.8	-	-
70	18	-0794	Aug 22	05:16:03	21737	-34550	N	-t	1.3054	0.5000	-0.5740	208.5	-	-
71	19	-0776	Sep 01	12:32:43	21438	-34327	N	-t	1.3465	0.4252	-0.6501	193.3	-	-
72	20	-0758	Sep 12	19:59:43	21141	-34104	N	-t	1.3799	0.3646	-0.7120	179.7	-	-
73	21	-0740	Sep 23	03:37:11	20846	-33881	N	-t	1.4054	0.3183	-0.7594	168.3	-	-
74	22	-0722	Oct 04	11:24:42	20553	-33658	N	-t	1.4237	0.2850	-0.7933	159.4	-	-
75	23	-0704	Oct 14	19:21:09	20262	-33435	N	-t	1.4353	0.2638	-0.8146	153.3	-	-
76	24	-0686	Oct 26	03:24:23	19973	-33212	N	-t	1.4422	0.2510	-0.8271	149.3	-	-
77	25	-0668	Nov 05	11:34:23	19686	-32989	N	-t	1.4444	0.2464	-0.8306	147.7	-	-
78	26	-0650	Nov 16	19:49:08	19401	-32766	N	-t	1.4437	0.2468	-0.8285	147.3	-	-
79	27	-0632	Nov 27	04:06:01	19119	-32543	N	-t	1.4419	0.2489	-0.8239	147.5	-	-
80	28	-0614	Dec 08	12:23:46	18838	-32320	N	-t	1.4400	0.2508	-0.8188	147.5	-	-
81	29	-0596	Dec 18	20:40:11	18560	-32097	N	-t	1.4399	0.2490	-0.8167	146.5	-	-
82	30	-0578	Dec 30	04:54:47	18283	-31874	N	-t	1.4418	0.2431	-0.8180	144.2	-	-
83	31	-0559	Jan 09	13:03:41	18009	-31651	N	-t	1.4491	0.2271	-0.8287	139.1	-	-
84	32	-0541	Jan 20	21:08:38	17736	-31428	N	-t	1.4603	0.2037	-0.8465	131.4	-	-
85	33	-0523	Jan 31	05:06:01	17466	-31205	N	-t	1.4782	0.1678	-0.8762	119.1	-	-
86	34	-0505	Feb 11	12:57:12	17198	-30982	N	-t	1.5016	0.1215	-0.9161	101.3	-	-
87	35	-0487	Feb 21	20:39:48	16891	-30759	N	-t	1.5327	0.0612	-0.9698	72.0	-	-

SAROS SERIES

26

Saros series 26 contains 85 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-35	-1919 Sep 09 05:36:35	44506 -48464	N	t-	1.5633	0.0306	-1.0512	53.8	-	-	-	-	-
02	-34	-1901 Sep 20 13:15:40	44077 -48241	N	t-	1.5417	0.0728	-1.0141	83.0	-	-	-	-	-
03	-33	-1883 Sep 30 21:01:40	43651 -48018	N	t-	1.5258	0.1044	-0.9873	99.4	-	-	-	-	-
04	-32	-1865 Oct 12 04:55:09	43226 -47795	N	t-	1.5164	0.1237	-0.9721	108.3	-	-	-	-	-
05	-31	-1847 Oct 22 12:52:58	42804 -47572	N	t-	1.5102	0.1368	-0.9623	114.0	-	-	-	-	-
06	-30	-1829 Nov 02 20:54:20	42384 -47349	N	t-	1.5071	0.1439	-0.9578	117.1	-	-	-	-	-
07	-29	-1811 Nov 13 04:57:17	41966 -47126	N	t-	1.5051	0.1482	-0.9551	119.0	-	-	-	-	-
08	-28	-1793 Nov 24 13:01:07	41550 -46903	N	t-	1.5041	0.1506	-0.9537	120.0	-	-	-	-	-
09	-27	-1775 Dec 04 21:01:40	41136 -46680	N	t-	1.5007	0.1569	-0.9473	122.6	-	-	-	-	-
10	-26	-1757 Dec 16 04:59:34	40724 -46457	N	t-	1.4953	0.1663	-0.9372	126.1	-	-	-	-	-

11	-25	-1739	Dec 26	12:50:54	40314	-46234	N	t-	1.4848	0.1848	-0.9172	132.8	-	-
12	-24	-1720	Jan 06	20:36:26	39906	-46011	N	t-	1.4697	0.2113	-0.8883	141.6	-	-
13	-23	-1702	Jan 17	04:11:58	39500	-45788	N	t-	1.4468	0.2520	-0.8449	154.0	-	-
14	-22	-1684	Jan 28	11:40:15	39097	-45565	N	t-	1.4181	0.3030	-0.7906	168.0	-	-
15	-21	-1666	Feb 07	18:57:50	38695	-45342	N	t-	1.3812	0.3689	-0.7212	184.1	-	-
16	-20	-1648	Feb 19	02:06:00	38296	-45119	N	t-	1.3364	0.4492	-0.6369	201.5	-	-
17	-19	-1630	Mar 01	09:04:05	37898	-44896	N	t-	1.2832	0.5449	-0.5374	219.6	-	-
18	-18	-1612	Mar 11	15:54:06	37503	-44673	N	t-	1.2231	0.6532	-0.4251	237.5	-	-
19	-17	-1594	Mar 22	22:36:05	37110	-44450	N	t-	1.1560	0.7743	-0.3002	255.1	-	-
20	-16	-1576	Apr 02	05:10:15	36718	-44227	N	t-	1.0821	0.9081	-0.1626	272.0	-	-
21	-15	-1558	Apr 13	11:39:29	36329	-44004	Nx	t-	1.0033	1.0509	-0.0165	287.8	-	-
22	-14	-1540	Apr 23	18:04:21	35942	-43781	P	t-	0.9200	1.2023	0.1380	302.1	89.7	-
23	-13	-1522	May 05	00:27:10	35557	-43558	P	t-	0.8341	1.3585	0.2970	314.9	128.4	-
24	-12	-1504	May 15	06:48:18	35174	-43335	P	t-	0.7460	1.5190	0.4599	326.1	155.5	-
25	-11	-1486	May 26	13:11:30	34793	-43112	P	t-	0.6584	1.6788	0.6216	335.5	175.8	-
26	-10	-1468	Jun 05	19:36:46	34414	-42889	P	t-	0.5714	1.8375	0.7818	343.3	191.6	-
27	-09	-1450	Jun 17	02:05:46	34038	-42666	P	t-	0.4865	1.9929	0.9383	349.4	203.6	-
28	-08	-1432	Jun 27	08:40:12	33663	-42443	T	t-	0.4051	2.1418	1.0879	354.1	212.6	47.3
29	-07	-1414	Jul 08	15:21:54	33291	-42220	T	t-	0.3287	2.2818	1.2283	357.5	219.1	72.5
30	-06	-1396	Jul 18	22:12:07	32920	-41997	T+	p-	0.2584	2.4109	1.3574	359.6	223.6	86.3
31	-05	-1378	Jul 30	05:10:39	32552	-41774	T+	pp	0.1939	2.5292	1.4755	360.8	226.4	94.7
32	-04	-1360	Aug 09	12:20:10	32185	-41551	T+	pp	0.1375	2.6329	1.5788	361.2	228.0	99.5
33	-03	-1342	Aug 20	19:40:01	31821	-41328	T+	pp	0.0886	2.7229	1.6683	361.1	228.6	102.1
34	-02	-1324	Aug 31	03:10:43	31459	-41105	T+	pp	0.0479	2.7978	1.7429	360.5	228.6	103.3
35	-01	-1306	Sep 11	10:51:51	31099	-40882	T+	pp	0.0148	2.8587	1.8034	359.6	228.1	103.5
36	00	-1288	Sep 21	18:43:39	30741	-40659	T-	pp	-0.0105	2.8665	1.8112	358.6	227.5	103.2
37	01	-1270	Oct 03	02:45:26	30385	-40436	T-	pp	-0.0286	2.8333	1.7781	357.5	226.7	102.7
38	02	-1252	Oct 13	10:54:31	30031	-40213	T-	pp	-0.0417	2.8089	1.7546	356.3	226.0	102.2

39	03	-1234	Oct 24	19:12:05	29679	-39990	T-	pp	-0.0486	2.7957	1.7424	355.0	225.3	101.8
40	04	-1216	Nov 04	03:34:41	29329	-39767	T-	pp	-0.0517	2.7890	1.7376	353.8	224.6	101.5
41	05	-1198	Nov 15	12:01:58	28981	-39544	T-	pp	-0.0523	2.7868	1.7378	352.4	224.0	101.3
42	06	-1180	Nov 25	20:29:26	28636	-39321	T-	pp	-0.0533	2.7834	1.7375	351.0	223.4	101.1
43	07	-1162	Dec 07	04:58:40	28292	-39098	T-	pp	-0.0536	2.7809	1.7388	349.6	222.9	101.0
44	08	-1144	Dec 17	13:25:21	27951	-38875	T-	pp	-0.0565	2.7733	1.7356	348.0	222.3	100.8
45	09	-1126	Dec 28	21:49:15	27611	-38652	T-	pp	-0.0624	2.7599	1.7272	346.4	221.7	100.6
46	10	-1107	Jan 08	06:07:40	27274	-38429	T-	pp	-0.0733	2.7372	1.7099	344.6	221.0	100.2
47	11	-1089	Jan 19	14:21:08	26939	-38206	T-	pp	-0.0893	2.7049	1.6835	342.8	220.3	99.5
48	12	-1071	Jan 29	22:27:18	26605	-37983	T-	pp	-0.1119	2.6603	1.6452	340.8	219.3	98.4
49	13	-1053	Feb 10	06:26:30	26274	-37760	T-	pp	-0.1410	2.6036	1.5949	338.5	218.0	96.6
50	14	-1035	Feb 20	14:18:18	25945	-37537	T-	pp	-0.1771	2.5342	1.5319	336.0	216.3	93.8
51	15	-1017	Mar 03	22:03:38	25618	-37314	T-	-p	-0.2192	2.4536	1.4577	333.1	214.0	89.6
52	16	-0999	Mar 14	05:40:48	25293	-37091	T-	-p	-0.2691	2.3589	1.3692	329.8	210.9	83.1
53	17	-0981	Mar 25	13:12:57	24970	-36868	T	-p	-0.3242	2.2550	1.2711	325.9	206.8	73.6
54	18	-0963	Apr 04	20:38:42	24650	-36645	T	-p	-0.3854	2.1398	1.1616	321.2	201.5	58.8
55	19	-0945	Apr 16	04:01:26	24331	-36422	T	-a	-0.4499	2.0189	1.0457	315.9	194.9	32.3
56	20	-0927	Apr 26	11:18:29	24014	-36199	P	-a	-0.5199	1.8882	0.9195	309.6	186.5	-
57	21	-0909	May 07	18:35:30	23700	-35976	P	-a	-0.5906	1.7564	0.7916	302.6	176.5	-
58	22	-0891	May 18	01:49:58	23387	-35753	P	-a	-0.6644	1.6193	0.6579	294.5	164.0	-
59	23	-0873	May 29	09:06:28	23077	-35530	P	-a	-0.7370	1.4848	0.5261	285.8	149.4	-
60	24	-0855	Jun 08	16:22:40	22768	-35307	P	-a	-0.8103	1.3494	0.3926	276.0	131.4	-
61	25	-0837	Jun 19	23:44:04	22462	-35084	P	-a	-0.8798	1.2210	0.2657	265.7	109.8	-
62	26	-0819	Jun 30	07:08:01	22158	-34861	P	-a	-0.9479	1.0958	0.1411	254.6	81.3	-
63	27	-0801	Jul 11	14:37:59	21856	-34638	P	-a	-1.0115	0.9789	0.0244	243.2	34.3	-
64	28	-0783	Jul 21	22:13:29	21556	-34415	N	-a	-1.0711	0.8699	-0.0851	231.5	-	-
65	29	-0765	Aug 02	05:57:11	21258	-34192	N	-a	-1.1244	0.7725	-0.1833	220.0	-	-
66	30	-0747	Aug 12	13:48:32	20962	-33969	N	-a	-1.1720	0.6858	-0.2714	208.9	-	-

67	31	-0729 Aug 23	21:47:53	20668 -33746	N	-a	-1.2137	0.6101	-0.3487	198.3	-	-
68	32	-0711 Sep 03	05:56:33	20376 -33523	N	-a	-1.2483	0.5475	-0.4131	188.8	-	-
69	33	-0693 Sep 14	14:13:30	20087 -33300	N	-a	-1.2769	0.4961	-0.4666	180.5	-	-
70	34	-0675 Sep 24	22:38:53	19799 -33077	N	-a	-1.2990	0.4566	-0.5081	173.8	-	-
71	35	-0657 Oct 06	07:11:32	19513 -32854	N	-a	-1.3157	0.4269	-0.5396	168.5	-	-
72	36	-0639 Oct 16	15:51:37	19230 -32631	N	-a	-1.3268	0.4073	-0.5610	164.8	-	-
73	37	-0621 Oct 28	00:37:07	18949 -32408	N	-a	-1.3339	0.3950	-0.5747	162.5	-	-
74	38	-0603 Nov 07	09:26:42	18669 -32185	N	-a	-1.3380	0.3881	-0.5827	161.2	-	-
75	39	-0585 Nov 18	18:19:31	18392 -31962	N	-a	-1.3398	0.3852	-0.5863	160.6	-	-
76	40	-0567 Nov 29	03:13:54	18117 -31739	N	-a	-1.3401	0.3847	-0.5870	160.5	-	-
77	41	-0549 Dec 10	12:07:26	17844 -31516	N	-a	-1.3416	0.3818	-0.5897	160.0	-	-
78	42	-0531 Dec 20	20:58:38	17573 -31293	N	-a	-1.3451	0.3750	-0.5958	158.7	-	-
79	43	-0512 Jan 01	05:46:22	17304 -31070	N	-a	-1.3515	0.3628	-0.6069	156.3	-	-
80	44	-0494 Jan 11	14:29:48	17018 -30847	N	-a	-1.3612	0.3442	-0.6242	152.6	-	-
81	45	-0476 Jan 22	23:05:49	16701 -30624	N	-a	-1.3771	0.3142	-0.6525	146.2	-	-
82	46	-0458 Feb 02	07:35:34	16393 -30401	N	-a	-1.3980	0.2750	-0.6900	137.4	-	-
83	47	-0440 Feb 13	15:56:27	16093 -30178	N	-a	-1.4263	0.2221	-0.7410	124.2	-	-
84	48	-0422 Feb 24	00:10:19	15802 -29955	N	-a	-1.4600	0.1594	-0.8020	105.9	-	-
85	49	-0404 Mar 06	08:13:48	15518 -29732	N	-a	-1.5019	0.0817	-0.8781	76.4	-	-

SAROS SERIES

Saros series 27 contains 85 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-37	-1926 Jul 28 21:01:47	44676 -48552	N	h-	-1.5162	0.0912	-0.9392	88.1	-	-	-	-	-
02	-36	-1908 Aug 08 04:26:05	44246 -48329	N	h-	-1.4624	0.1897	-0.8405	125.6	-	-	-	-	-
03	-35	-1890 Aug 19 12:02:13	43819 -48106	N	a-	-1.4170	0.2730	-0.7572	149.0	-	-	-	-	-
04	-34	-1872 Aug 29 19:47:20	43394 -47883	N	a-	-1.3779	0.3447	-0.6854	165.8	-	-	-	-	-
05	-33	-1854 Sep 10 03:44:40	42971 -47660	N	a-	-1.3479	0.3999	-0.6302	177.1	-	-	-	-	-
06	-32	-1836 Sep 20 11:50:44	42550 -47437	N	a-	-1.3239	0.4437	-0.5861	185.1	-	-	-	-	-
07	-31	-1818 Oct 01 20:06:36	42131 -47214	N	a-	-1.3070	0.4744	-0.5547	190.3	-	-	-	-	-
08	-30	-1800 Oct 12 04:29:49	41714 -46991	N	a-	-1.2952	0.4956	-0.5326	193.4	-	-	-	-	-
09	-29	-1782 Oct 23 13:00:22	41299 -46768	N	a-	-1.2883	0.5075	-0.5192	194.8	-	-	-	-	-
10	-28	-1764 Nov 02 21:35:07	40886 -46545	N	a-	-1.2844	0.5136	-0.5110	195.2	-	-	-	-	-
11	-27	-1746 Nov 14 06:12:38	40475 -46322	N	a-	-1.2819	0.5169	-0.5051	195.1	-	-	-	-	-
12	-26	-1728 Nov 24 14:51:35	40067 -46099	N	a-	-1.2799	0.5188	-0.5000	194.7	-	-	-	-	-
13	-25	-1710 Dec 05 23:30:18	39660 -45876	N	a-	-1.2769	0.5225	-0.4925	194.6	-	-	-	-	-
14	-24	-1692 Dec 16 08:05:51	39256 -45653	N	a-	-1.2709	0.5314	-0.4793	195.4	-	-	-	-	-
15	-23	-1674 Dec 27 16:37:29	38853 -45430	N	a-	-1.2611	0.5468	-0.4590	197.1	-	-	-	-	-
16	-22	-1655 Jan 07 01:03:37	38453 -45207	N	a-	-1.2463	0.5714	-0.4293	200.2	-	-	-	-	-
17	-21	-1637 Jan 18 09:24:17	38055 -44984	N	a-	-1.2265	0.6049	-0.3901	204.6	-	-	-	-	-

18	-20	-1619	Jan 28	17:36:29	37659	-44761	N	a-	-1.1991	0.6524	-0.3369	210.6	-	-
19	-19	-1601	Feb 09	01:42:32	37264	-44538	N	a-	-1.1660	0.7102	-0.2733	217.6	-	-
20	-18	-1583	Feb 19	09:40:01	36872	-44315	N	a-	-1.1252	0.7822	-0.1956	225.9	-	-
21	-17	-1565	Mar 02	17:31:06	36482	-44092	N	a-	-1.0785	0.8649	-0.1073	234.6	-	-
22	-16	-1547	Mar 13	01:14:08	36095	-43869	N	a-	-1.0244	0.9616	-0.0053	244.0	-	-
23	-15	-1529	Mar 24	08:51:59	35709	-43646	P	a-	-0.9653	1.0675	0.1056	253.4	70.9	-
24	-14	-1511	Apr 03	16:24:01	35325	-43423	P	a-	-0.9005	1.1841	0.2266	262.6	101.9	-
25	-13	-1493	Apr 14	23:51:16	34943	-43200	P	a-	-0.8311	1.3094	0.3559	271.4	125.1	-
26	-12	-1475	Apr 25	07:15:31	34564	-42977	P	a-	-0.7586	1.4408	0.4906	279.6	143.7	-
27	-11	-1457	May 06	14:37:31	34186	-42754	P	a-	-0.6839	1.5766	0.6291	287.1	158.9	-
28	-10	-1439	May 16	21:59:12	33811	-42531	P	a-	-0.6081	1.7146	0.7691	293.6	171.5	-
29	-09	-1421	May 28	05:20:02	33437	-42308	P	a-	-0.5314	1.8547	0.9105	299.4	181.9	-
30	-08	-1403	Jun 07	12:43:32	33066	-42085	T	a-	-0.4566	1.9917	1.0481	304.1	190.2	32.4
31	-07	-1385	Jun 18	20:08:59	32697	-41862	T	a-	-0.3833	2.1261	1.1825	308.1	196.7	60.6
32	-06	-1367	Jun 29	03:39:02	32330	-41639	T	p-	-0.3138	2.2541	1.3098	311.2	201.7	75.6
33	-05	-1349	Jul 10	11:13:14	31964	-41416	T-	p-	-0.2475	2.3764	1.4308	313.6	205.4	85.3
34	-04	-1331	Jul 20	18:54:52	31601	-41193	T-	p-	-0.1873	2.4877	1.5403	315.3	207.8	91.4
35	-03	-1313	Aug 01	02:42:53	31240	-40970	T-	p-	-0.1327	2.5891	1.6394	316.6	209.5	95.2
36	-02	-1295	Aug 11	10:38:41	30882	-40747	T-	p-	-0.0846	2.6788	1.7264	317.4	210.4	97.4
37	-01	-1277	Aug 22	18:42:30	30525	-40524	T-	pp	-0.0432	2.7563	1.8009	318.0	210.8	98.4
38	00	-1259	Sep 02	02:54:58	30170	-40301	T-	pp	-0.0090	2.8206	1.8621	318.5	210.9	98.6
39	01	-1241	Sep 13	11:15:28	29817	-40078	T+	pp	0.0184	2.8049	1.8431	318.8	210.8	98.4
40	02	-1223	Sep 23	19:43:32	29467	-39855	T+	pp	0.0394	2.7681	1.8030	319.2	210.7	98.1
41	03	-1205	Oct 05	04:18:52	29118	-39632	T+	-p	0.0540	2.7427	1.7747	319.6	210.6	97.7
42	04	-1187	Oct 15	13:00:51	28772	-39409	T+	-p	0.0631	2.7275	1.7566	320.0	210.5	97.4
43	05	-1169	Oct 26	21:47:06	28427	-39186	T+	-p	0.0685	2.7189	1.7456	320.4	210.5	97.2
44	06	-1151	Nov 06	06:37:51	28085	-38963	T+	-p	0.0699	2.7174	1.7419	320.9	210.6	97.2
45	07	-1133	Nov 17	15:29:41	27745	-38740	T+	-p	0.0703	2.7174	1.7403	321.4	210.8	97.2

46	08	-1115	Nov 28	00:22:52	27407	-38517	T+	-p	0.0691	2.7203	1.7420	321.9	211.1	97.3
47	09	-1097	Dec 09	09:12:59	27071	-38294	T+	-p	0.0703	2.7184	1.7394	322.4	211.3	97.4
48	10	-1079	Dec 19	18:01:52	26737	-38071	T+	-p	0.0722	2.7150	1.7358	322.9	211.6	97.4
49	11	-1061	Dec 31	02:45:04	26405	-37848	T+	-p	0.0790	2.7025	1.7234	323.4	211.8	97.4
50	12	-1042	Jan 10	11:23:11	26075	-37625	T+	-p	0.0895	2.6831	1.7044	323.8	212.0	97.2
51	13	-1024	Jan 21	19:52:46	25747	-37402	T+	-p	0.1068	2.6508	1.6728	324.1	212.1	96.6
52	14	-1006	Feb 01	04:15:41	25421	-37179	T+	-p	0.1294	2.6091	1.6319	324.4	212.1	95.6
53	15	-0988	Feb 12	12:29:23	25097	-36956	T+	-p	0.1595	2.5533	1.5769	324.4	211.6	93.9
54	16	-0970	Feb 22	20:33:56	24776	-36733	T+	-p	0.1968	2.4845	1.5089	324.2	210.8	90.9
55	17	-0952	Mar 05	04:29:10	24456	-36510	T+	-p	0.2415	2.4022	1.4271	323.7	209.3	86.3
56	18	-0934	Mar 16	12:15:44	24139	-36287	T	-p	0.2928	2.3080	1.3332	322.6	206.9	79.1
57	19	-0916	Mar 26	19:53:20	23824	-36064	T	-a	0.3509	2.2014	1.2264	320.9	203.4	67.8
58	20	-0898	Apr 07	03:22:41	23510	-35841	T	-a	0.4154	2.0833	1.1078	318.4	198.4	48.7
59	21	-0880	Apr 17	10:44:38	23199	-35618	P	-a	0.4852	1.9558	0.9793	315.0	191.6	-
60	22	-0862	Apr 28	18:01:01	22890	-35395	P	-a	0.5586	1.8219	0.8438	310.5	182.7	-
61	23	-0844	May 09	01:10:54	22583	-35172	P	-a	0.6365	1.6801	0.6998	304.8	171.0	-
62	24	-0826	May 20	08:18:06	22278	-34949	P	-a	0.7155	1.5365	0.5534	297.8	156.2	-
63	25	-0808	May 30	15:21:54	21975	-34726	P	-a	0.7960	1.3905	0.4040	289.5	137.1	-
64	26	-0790	Jun 10	22:26:02	21674	-34503	P	-a	0.8754	1.2469	0.2564	279.9	112.0	-
65	27	-0772	Jun 21	05:28:20	21375	-34280	P	-a	0.9550	1.1032	0.1081	268.7	74.5	-
66	28	-0754	Jul 02	12:34:03	21078	-34057	N	-a	1.0305	0.9671	-0.0330	256.5	-	-
67	29	-0736	Jul 12	19:41:25	20784	-33834	N	-a	1.1034	0.8363	-0.1695	242.9	-	-
68	30	-0718	Jul 24	02:54:06	20491	-33611	N	-a	1.1708	0.7156	-0.2961	228.6	-	-
69	31	-0700	Aug 03	10:10:45	20201	-33388	N	-a	1.2339	0.6030	-0.4151	213.2	-	-
70	32	-0682	Aug 14	17:35:11	19912	-33165	N	-a	1.2896	0.5041	-0.5205	197.8	-	-
71	33	-0664	Aug 25	01:05:56	19626	-32942	N	-a	1.3389	0.4170	-0.6143	182.3	-	-
72	34	-0646	Sep 05	08:43:37	19342	-32719	N	-a	1.3815	0.3422	-0.6957	167.0	-	-
73	35	-0628	Sep 15	16:28:54	19059	-32496	N	-a	1.4169	0.2804	-0.7641	152.8	-	-

74	36	-0610	Sep 27	00:21:36	18779	-32273	N	-a	1.4456	0.2310	-0.8197	139.9	-	-
75	37	-0592	Oct 07	08:21:24	18501	-32050	N	-a	1.4675	0.1938	-0.8629	129.2	-	-
76	38	-0574	Oct 18	16:26:07	18225	-31827	N	-a	1.4846	0.1652	-0.8969	120.0	-	-
77	39	-0556	Oct 29	00:36:46	17951	-31604	N	-a	1.4960	0.1467	-0.9203	113.7	-	-
78	40	-0538	Nov 09	08:50:28	17679	-31381	N	-a	1.5044	0.1334	-0.9379	109.0	-	-
79	41	-0520	Nov 19	17:06:24	17409	-31158	N	-h	1.5102	0.1245	-0.9503	105.7	-	-
80	42	-0502	Dec 01	01:22:09	17142	-30935	N	-h	1.5157	0.1159	-0.9617	102.4	-	-
81	43	-0484	Dec 11	09:36:53	16825	-30712	N	-h	1.5213	0.1066	-0.9731	98.6	-	-
82	44	-0466	Dec 22	17:47:51	16513	-30489	N	-h	1.5294	0.0925	-0.9884	92.2	-	-
83	45	-0447	Jan 02	01:53:37	16211	-30266	N	-t	1.5410	0.0714	-1.0101	81.3	-	-
84	46	-0429	Jan 13	09:52:55	15916	-30043	N	-t	1.5573	0.0416	-1.0400	62.4	-	-
85	47	-0411	Jan 23	17:44:41	15630	-29820	Ne	-t	1.5791	0.0013	-1.0798	11.0	-	-

SAROS SERIES

28

Saros series 28 contains 74 lunar eclipses.

PHASE

DURATIONS

SEQ. REL. CALENDAR TD ΔT LUNA ECL. QSE GAMMA PEN. UM. PEN. PAR. TOTAL

NUM.	NUM.	DATE	OF	s	NUM	TYPE	MAG.	MAG.	m	m	m	
GREATEST												
ECLIPSE												
01	-38	-1897 Jul 09 08:15:12	43987	-48194	N	a-	1.4840	0.1081	-0.8387	87.0	-	-
02	-37	-1879 Jul 19 15:57:40	43561	-47971	N	a-	1.4295	0.2098	-0.7403	120.3	-	-
03	-36	-1861 Jul 30 23:46:14	43137	-47748	N	a-	1.3801	0.3022	-0.6516	143.4	-	-
04	-35	-1843 Aug 10 07:42:32	42715	-47525	N	a-	1.3372	0.3831	-0.5748	160.5	-	-
05	-34	-1825 Aug 21 15:46:39	42296	-47302	N	a-	1.3010	0.4516	-0.5106	173.5	-	-
06	-33	-1807 Aug 31 23:59:26	41878	-47079	N	a-	1.2719	0.5072	-0.4594	183.4	-	-
07	-32	-1789 Sep 12 08:18:41	41462	-46856	N	a-	1.2484	0.5526	-0.4185	191.0	-	-
08	-31	-1771 Sep 22 16:46:43	41049	-46633	N	a-	1.2324	0.5842	-0.3913	196.3	-	-
09	-30	-1753 Oct 04 01:20:51	40637	-46410	N	a-	1.2219	0.6056	-0.3741	199.9	-	-
10	-29	-1735 Oct 14 10:01:17	40228	-46187	N	a-	1.2169	0.6167	-0.3667	202.1	-	-
11	-28	-1717 Oct 25 18:45:04	39820	-45964	N	a-	1.2152	0.6215	-0.3654	203.3	-	-
12	-27	-1699 Nov 05 03:32:28	39415	-45741	N	a-	1.2170	0.6197	-0.3701	203.6	-	-
13	-26	-1681 Nov 16 12:20:37	39012	-45518	N	a-	1.2201	0.6153	-0.3769	203.5	-	-
14	-25	-1663 Nov 26 21:08:00	38611	-45295	N	a-	1.2234	0.6102	-0.3840	203.3	-	-
15	-24	-1645 Dec 08 05:53:16	38212	-45072	N	a-	1.2257	0.6067	-0.3890	203.3	-	-
16	-23	-1627 Dec 18 14:34:38	37815	-44849	N	a-	1.2260	0.6067	-0.3899	203.8	-	-
17	-22	-1609 Dec 29 23:10:14	37420	-44626	N	a-	1.2221	0.6140	-0.3832	205.4	-	-
18	-21	-1590 Jan 09 07:38:32	37027	-44403	N	a-	1.2132	0.6305	-0.3668	208.4	-	-
19	-20	-1572 Jan 20 15:59:14	36636	-44180	N	a-	1.1990	0.6565	-0.3409	212.7	-	-
20	-19	-1554 Jan 31 00:11:21	36247	-43957	N	a-	1.1789	0.6933	-0.3039	218.4	-	-
21	-18	-1536 Feb 11 08:13:02	35861	-43734	N	a-	1.1511	0.7442	-0.2528	225.8	-	-
22	-17	-1518 Feb 21 16:05:37	35476	-43511	N	a-	1.1167	0.8073	-0.1897	234.4	-	-
23	-16	-1500 Mar 03 23:47:48	35094	-43288	N	a-	1.0746	0.8846	-0.1125	244.2	-	-
24	-15	-1482 Mar 15 07:21:28	34713	-43065	N	a-	1.0264	0.9734	-0.0241	254.7	-	-
25	-14	-1464 Mar 25 14:44:12	34335	-42842	P	h-	0.9703	1.0767	0.0784	265.9	63.6	-

26	-13	-1446	Apr 05	21:59:59	33959	-42619	P	h-	0.9092	1.1892	0.1899	277.1	97.7	-
27	-12	-1428	Apr 16	05:07:17	33584	-42396	P	t-	0.8420	1.3134	0.3124	288.3	123.6	-
28	-11	-1410	Apr 27	12:08:38	33212	-42173	P	t-	0.7708	1.4451	0.4420	299.1	144.7	-
29	-10	-1392	May 07	19:04:14	32842	-41950	P	t-	0.6957	1.5843	0.5784	309.3	162.6	-
30	-09	-1374	May 19	01:56:43	32474	-41727	P	t-	0.6189	1.7270	0.7179	318.7	177.7	-
31	-08	-1356	May 29	08:46:45	32108	-41504	P	t-	0.5409	1.8721	0.8591	327.3	190.4	-
32	-07	-1338	Jun 09	15:34:58	31744	-41281	T	t-	0.4622	2.0185	1.0012	334.9	201.0	5.5
33	-06	-1320	Jun 19	22:24:36	31383	-41058	T	t-	0.3855	2.1618	1.1395	341.5	209.5	57.2
34	-05	-1302	Jul 01	05:15:56	31023	-40835	T	p-	0.3108	2.3016	1.2740	347.1	216.3	76.8
35	-04	-1284	Jul 11	12:11:43	30665	-40612	T+	pp	0.2406	2.4332	1.4000	351.7	221.4	88.7
36	-03	-1266	Jul 22	19:10:59	30310	-40389	T+	pp	0.1741	2.5583	1.5190	355.6	225.1	96.4
37	-02	-1248	Aug 02	02:18:00	29956	-40166	T+	pp	0.1146	2.6707	1.6251	358.7	227.6	100.9
38	-01	-1230	Aug 13	09:30:39	29605	-39943	T+	pp	0.0603	2.7735	1.7215	361.2	229.2	103.4
39	00	-1212	Aug 23	16:51:15	29255	-39720	T+	pp	0.0135	2.8627	1.8043	363.2	230.1	104.2
40	01	-1194	Sep 04	00:18:48	28908	-39497	T-	pp	-0.0270	2.8409	1.7763	364.8	230.4	104.1
41	02	-1176	Sep 14	07:55:34	28563	-39274	T-	pp	-0.0590	2.7854	1.7146	366.3	230.5	103.3
42	03	-1158	Sep 25	15:39:08	28220	-39051	T-	pp	-0.0850	2.7405	1.6641	367.6	230.5	102.3
43	04	-1140	Oct 05	23:29:35	27879	-38828	T-	pp	-0.1046	2.7071	1.6255	368.7	230.4	101.3
44	05	-1122	Oct 17	07:26:03	27540	-38605	T-	pp	-0.1186	2.6838	1.5975	369.8	230.4	100.4
45	06	-1104	Oct 27	15:28:20	27203	-38382	T-	pp	-0.1269	2.6706	1.5803	370.9	230.5	99.9
46	07	-1086	Nov 07	23:32:47	26868	-38159	T-	pp	-0.1332	2.6608	1.5673	371.8	230.6	99.4
47	08	-1068	Nov 18	07:39:36	26535	-37936	T-	pp	-0.1367	2.6555	1.5595	372.7	230.8	99.2
48	09	-1050	Nov 29	15:45:33	26205	-37713	T-	pp	-0.1406	2.6491	1.5515	373.4	231.0	99.0
49	10	-1032	Dec 09	23:50:59	25876	-37490	T-	pp	-0.1446	2.6423	1.5439	374.0	231.2	98.8
50	11	-1014	Dec 21	07:50:44	25549	-37267	T-	pp	-0.1525	2.6278	1.5294	374.3	231.2	98.2
51	12	-0996	Dec 31	15:47:08	25225	-37044	T-	pp	-0.1629	2.6084	1.5107	374.5	231.1	97.4
52	13	-0977	Jan 11	23:34:51	24903	-36821	T-	pp	-0.1798	2.5767	1.4804	374.3	230.7	95.9
53	14	-0959	Jan 22	07:16:03	24582	-36598	T-	pp	-0.2019	2.5350	1.4407	373.8	230.0	93.6

54	15	-0941	Feb 02	14:46:05	24264	-36375	T-	pp	-0.2329	2.4770	1.3851	372.8	228.6	89.7
55	16	-0923	Feb 12	22:08:44	23948	-36152	T-	-p	-0.2695	2.4084	1.3192	371.3	226.5	83.9
56	17	-0905	Feb 24	05:19:57	23634	-35929	T	-t	-0.3149	2.3236	1.2374	369.1	223.4	74.7
57	18	-0887	Mar 06	12:21:58	23322	-35706	T	-t	-0.3677	2.2251	1.1420	366.1	219.0	59.7
58	19	-0869	Mar 17	19:13:49	23012	-35483	T	-t	-0.4285	2.1121	1.0319	362.0	212.8	29.4
59	20	-0851	Mar 28	01:57:43	22704	-35260	P	-t	-0.4957	1.9872	0.9102	356.8	204.5	-
60	21	-0833	Apr 08	08:33:46	22398	-35037	P	-t	-0.5690	1.8513	0.7771	350.1	193.5	-
61	22	-0815	Apr 18	15:02:58	22094	-34814	P	-t	-0.6475	1.7059	0.6344	341.9	179.1	-
62	23	-0797	Apr 29	21:27:38	21792	-34591	P	-t	-0.7297	1.5539	0.4847	331.9	160.3	-
63	24	-0779	May 10	03:49:05	21493	-34368	P	-t	-0.8145	1.3972	0.3300	320.1	135.3	-
64	25	-0761	May 21	10:08:26	21195	-34145	P	-t	-0.9010	1.2377	0.1721	306.3	99.9	-
65	26	-0743	May 31	16:28:12	20900	-33922	P	-t	-0.9871	1.0791	0.0147	290.5	29.9	-
66	27	-0725	Jun 11	22:49:32	20606	-33699	N	-t	-1.0721	0.9227	-0.1409	272.6	-	-
67	28	-0707	Jun 22	05:14:56	20315	-33476	N	-t	-1.1540	0.7723	-0.2909	252.8	-	-
68	29	-0689	Jul 03	11:43:55	20026	-33253	N	-t	-1.2332	0.6269	-0.4362	230.7	-	-
69	30	-0671	Jul 13	18:20:30	19739	-33030	N	-t	-1.3065	0.4925	-0.5708	206.8	-	-
70	31	-0653	Jul 25	01:04:03	19453	-32807	N	-t	-1.3747	0.3677	-0.6961	180.4	-	-
71	32	-0635	Aug 04	07:57:27	19170	-32584	N	-t	-1.4352	0.2571	-0.8075	152.1	-	-
72	33	-0617	Aug 15	14:59:18	18890	-32361	N	-t	-1.4892	0.1583	-0.9072	120.2	-	-
73	34	-0599	Aug 25	22:12:46	18611	-32138	N	-t	-1.5348	0.0752	-0.9911	83.3	-	-
74	35	-0581	Sep 06	05:35:49	18334	-31915	Ne	-t	-1.5732	0.0052	-1.0622	22.0	-	-

SAROS SERIES

Saros series 29 contains 83 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-34	-1814 Jul 21	10:04:42	42043	-47167	Nb t-	-1.5402	0.0632	-0.9991	76.6	-	-		
02	-33	-1796 Jul 31	17:01:15	41626	-46944	N t-	-1.4851	0.1672	-0.9007	123.9	-	-		
03	-32	-1778 Aug 12	00:05:28	41212	-46721	N t-	-1.4359	0.2602	-0.8133	153.7	-	-		
04	-31	-1760 Aug 22	07:17:57	40799	-46498	N t-	-1.3937	0.3405	-0.7385	175.2	-	-		
05	-30	-1742 Sep 02	14:39:33	40389	-46275	N t-	-1.3588	0.4073	-0.6771	191.0	-	-		
06	-29	-1724 Sep 12	22:09:51	39981	-46052	N t-	-1.3312	0.4604	-0.6290	202.6	-	-		
07	-28	-1706 Sep 24	05:47:32	39575	-45829	N t-	-1.3098	0.5021	-0.5920	211.3	-	-		
08	-27	-1688 Oct 04	13:33:20	39171	-45606	N t-	-1.2949	0.5313	-0.5668	217.2	-	-		
09	-26	-1670 Oct 15	21:25:15	38769	-45383	N t-	-1.2850	0.5513	-0.5502	221.2	-	-		
10	-25	-1652 Oct 26	05:22:20	38369	-45160	N t-	-1.2796	0.5626	-0.5415	223.6	-	-		
11	-24	-1634 Nov 06	13:21:38	37971	-44937	N t-	-1.2759	0.5701	-0.5358	225.2	-	-		
12	-23	-1616 Nov 16	21:23:25	37575	-44714	N t-	-1.2743	0.5736	-0.5333	226.0	-	-		
13	-22	-1598 Nov 28	05:24:52	37182	-44491	N t-	-1.2722	0.5775	-0.5295	226.8	-	-		
14	-21	-1580 Dec 08	13:23:50	36790	-44268	N t-	-1.2680	0.5848	-0.5214	228.1	-	-		
15	-20	-1562 Dec 19	21:19:03	36401	-44045	N t-	-1.2606	0.5976	-0.5071	230.2	-	-		
16	-19	-1544 Dec 30	05:08:40	36013	-43822	N t-	-1.2484	0.6188	-0.4835	233.7	-	-		
17	-18	-1525 Jan 10	12:51:57	35628	-43599	N t-	-1.2309	0.6494	-0.4500	238.5	-	-		

18	-17	-1507	Jan 20	20:26:21	35244	-43376	N	t-	-1.2058	0.6937	-0.4021	245.1	-	-
19	-16	-1489	Feb 01	03:53:08	34863	-43153	N	t-	-1.1741	0.7500	-0.3419	253.1	-	-
20	-15	-1471	Feb 11	11:10:08	34484	-42930	N	t-	-1.1340	0.8213	-0.2663	262.5	-	-
21	-14	-1453	Feb 22	18:17:59	34107	-42707	N	t-	-1.0861	0.9069	-0.1762	272.9	-	-
22	-13	-1435	Mar 05	01:16:22	33732	-42484	Nx	t-	-1.0301	1.0075	-0.0711	284.0	-	-
23	-12	-1417	Mar 16	08:06:53	33359	-42261	P	t-	-0.9670	1.1208	0.0468	295.3	53.0	-
24	-11	-1399	Mar 26	14:50:10	32988	-42038	P	t-	-0.8973	1.2466	0.1770	306.4	101.0	-
25	-10	-1381	Apr 06	21:26:00	32619	-41815	P	t-	-0.8208	1.3848	0.3195	317.1	132.6	-
26	-09	-1363	Apr 17	03:57:45	32252	-41592	P	t-	-0.7403	1.5305	0.4692	326.9	156.8	-
27	-08	-1345	Apr 28	10:25:28	31888	-41369	P	t-	-0.6558	1.6838	0.6260	335.6	176.2	-
28	-07	-1327	May 08	16:52:14	31525	-41146	P	t-	-0.5694	1.8406	0.7861	343.0	191.8	-
29	-06	-1309	May 19	23:17:34	31165	-40923	P	t-	-0.4809	2.0016	0.9499	349.2	204.3	-
30	-05	-1291	May 30	05:45:27	30806	-40700	T	t-	-0.3933	2.1610	1.1118	353.9	213.8	52.9
31	-04	-1273	Jun 10	12:16:10	30450	-40477	T	t-	-0.3074	2.3178	1.2704	357.4	220.8	77.8
32	-03	-1255	Jun 20	18:51:18	30096	-40254	T-	pp	-0.2241	2.4699	1.4241	359.5	225.5	91.7
33	-02	-1237	Jul 02	01:32:52	29743	-40031	T-	pp	-0.1450	2.6144	1.5697	360.5	228.3	99.6
34	-01	-1219	Jul 12	08:22:00	29393	-39808	T-	pp	-0.0713	2.7493	1.7053	360.5	229.5	103.5
35	00	-1201	Jul 23	15:20:35	29045	-39585	T-	pp	-0.0045	2.8718	1.8281	359.8	229.4	104.5
36	01	-1183	Aug 02	22:27:19	28699	-39362	T+	pp	0.0565	2.7761	1.7327	358.4	228.4	103.4
37	02	-1165	Aug 14	05:45:22	28355	-39139	T+	pp	0.1089	2.6801	1.6366	356.7	226.7	100.9
38	03	-1147	Aug 24	13:12:50	28013	-38916	T+	pp	0.1541	2.5972	1.5535	354.7	224.6	97.4
39	04	-1129	Sep 04	20:52:06	27673	-38693	T+	pp	0.1906	2.5302	1.4864	352.7	222.4	93.7
40	05	-1111	Sep 15	04:40:18	27336	-38470	T+	pp	0.2204	2.4757	1.4318	350.7	220.3	90.0
41	06	-1093	Sep 26	12:40:09	27000	-38247	T+	-p	0.2415	2.4369	1.3932	348.9	218.5	87.0
42	07	-1075	Oct 06	20:48:03	26666	-38024	T+	-p	0.2565	2.4090	1.3658	347.3	217.0	84.5
43	08	-1057	Oct 18	05:04:40	26335	-37801	T+	-p	0.2653	2.3924	1.3501	345.8	215.8	83.0
44	09	-1039	Oct 28	13:27:15	26005	-37578	T+	-p	0.2700	2.3831	1.3422	344.4	214.9	82.0
45	10	-1021	Nov 08	21:56:14	25678	-37355	T+	-p	0.2706	2.3810	1.3421	343.1	214.3	81.8

46	11	-1003 Nov 19 06:27:28	25353 -37132	T+ -p	0.2699	2.3810	1.3447	341.8	213.8	81.9
47	12	-0985 Nov 30 15:00:47	25030 -36909	T+ -p	0.2685	2.3819	1.3488	340.5	213.4	82.0
48	13	-0967 Dec 10 23:33:23	24708 -36686	T+ -p	0.2685	2.3799	1.3507	339.1	212.9	82.0
49	14	-0949 Dec 22 08:05:33	24389 -36463	T+ -p	0.2701	2.3749	1.3501	337.6	212.3	81.8
50	15	-0930 Jan 01 16:32:17	24072 -36240	T -p	0.2769	2.3599	1.3401	335.8	211.4	80.8
51	16	-0912 Jan 13 00:55:32	23757 -36017	T -p	0.2873	2.3380	1.3236	333.8	210.3	79.2
52	17	-0894 Jan 23 09:11:21	23444 -35794	T -p	0.3047	2.3032	1.2945	331.5	208.7	76.2
53	18	-0876 Feb 03 17:22:11	23134 -35571	T -p	0.3270	2.2593	1.2567	328.9	206.8	72.0
54	19	-0858 Feb 14 01:23:28	22825 -35348	T -p	0.3580	2.1992	1.2027	325.9	204.0	65.0
55	20	-0840 Feb 25 09:19:38	22518 -35125	T -p	0.3942	2.1297	1.1394	322.4	200.5	54.9
56	21	-0822 Mar 07 17:06:41	22214 -34902	T -a	0.4386	2.0453	1.0610	318.2	195.9	37.2
57	22	-0804 Mar 18 00:48:05	21911 -34679	P -a	0.4884	1.9510	0.9725	313.4	190.2	-
58	23	-0786 Mar 29 08:21:37	21611 -34456	P -a	0.5454	1.8435	0.8704	307.7	182.8	-
59	24	-0768 Apr 08 15:51:27	21312 -34233	P -a	0.6063	1.7292	0.7613	301.2	173.7	-
60	25	-0750 Apr 19 23:16:10	21016 -34010	P -a	0.6723	1.6059	0.6424	293.7	162.3	-
61	26	-0732 Apr 30 06:37:39	20722 -33787	P -a	0.7417	1.4765	0.5171	285.0	148.2	-
62	27	-0714 May 11 13:57:12	20430 -33564	P -a	0.8131	1.3439	0.3878	275.3	130.6	-
63	28	-0696 May 21 21:16:22	20140 -33341	P -a	0.8853	1.2099	0.2566	264.5	108.0	-
64	29	-0678 Jun 02 04:35:57	19852 -33118	P -a	0.9577	1.0759	0.1247	252.5	76.5	-
65	30	-0660 Jun 12 11:56:41	19566 -32895	N -a	1.0297	0.9432	-0.0067	239.2	-	-
66	31	-0642 Jun 23 19:20:59	19282 -32672	N -a	1.0991	0.8155	-0.1336	225.0	-	-
67	32	-0624 Jul 04 02:49:29	19000 -32449	N -a	1.1651	0.6943	-0.2547	209.8	-	-
68	33	-0606 Jul 15 10:22:42	18720 -32226	N -a	1.2275	0.5801	-0.3693	193.7	-	-
69	34	-0588 Jul 25 18:02:20	18443 -32003	N -a	1.2849	0.4753	-0.4752	176.9	-	-
70	35	-0570 Aug 06 01:49:16	18167 -31780	N -a	1.3366	0.3812	-0.5708	159.7	-	-
71	36	-0552 Aug 16 09:44:13	17894 -31557	N -a	1.3819	0.2990	-0.6549	142.5	-	-
72	37	-0534 Aug 27 17:46:12	17622 -31334	N -a	1.4218	0.2269	-0.7292	124.9	-	-
73	38	-0516 Sep 07 01:57:13	17353 -31111	N -a	1.4545	0.1680	-0.7905	108.1	-	-

SAROS SERIES

30

												PHASE		
												DURATIONS		
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														

01	-37	-1803	Jun 19	10:21:59	41790	-47032	Nb t-	1.5508	0.0236	-0.9987	45.1	-	-
02	-36	-1785	Jun 30	17:19:23	41375	-46809	N h-	1.4759	0.1602	-0.8605	115.6	-	-
03	-35	-1767	Jul 11	00:23:39	40962	-46586	N h-	1.4050	0.2898	-0.7299	153.1	-	-
04	-34	-1749	Jul 22	07:37:06	40551	-46363	N h-	1.3400	0.4086	-0.6103	179.2	-	-
05	-33	-1731	Aug 01	14:59:46	40142	-46140	N a-	1.2813	0.5161	-0.5023	198.6	-	-
06	-32	-1713	Aug 12	22:33:22	39735	-45917	N a-	1.2304	0.6095	-0.4087	213.2	-	-
07	-31	-1695	Aug 23	06:17:06	39330	-45694	N a-	1.1865	0.6899	-0.3282	224.2	-	-
08	-30	-1677	Sep 03	14:10:47	38927	-45471	N a-	1.1499	0.7571	-0.2610	232.6	-	-
09	-29	-1659	Sep 13	22:15:03	38527	-45248	N a-	1.1209	0.8102	-0.2077	238.5	-	-
10	-28	-1641	Sep 25	06:28:36	38128	-45025	N a-	1.0987	0.8508	-0.1668	242.6	-	-
11	-27	-1623	Oct 05	14:50:24	37731	-44802	N a-	1.0826	0.8801	-0.1369	245.2	-	-
12	-26	-1605	Oct 16	23:19:22	37337	-44579	N a-	1.0716	0.8997	-0.1163	246.7	-	-
13	-25	-1587	Oct 27	07:54:32	36944	-44356	N a-	1.0650	0.9110	-0.1035	247.1	-	-
14	-24	-1569	Nov 07	16:33:55	36554	-44133	N a-	1.0613	0.9170	-0.0956	247.0	-	-
15	-23	-1551	Nov 18	01:15:14	36166	-43910	N a-	1.0584	0.9210	-0.0891	246.6	-	-
16	-22	-1533	Nov 29	09:57:55	35780	-43687	N a-	1.0561	0.9236	-0.0834	246.0	-	-
17	-21	-1515	Dec 09	18:39:54	35395	-43464	N a-	1.0530	0.9274	-0.0759	245.6	-	-
18	-20	-1497	Dec 21	03:18:40	35013	-43241	N a-	1.0466	0.9371	-0.0620	245.8	-	-
19	-19	-1479	Dec 31	11:53:05	34633	-43018	N a-	1.0361	0.9541	-0.0406	246.7	-	-
20	-18	-1460	Jan 11	20:22:09	34255	-42795	N a-	1.0210	0.9793	-0.0103	248.4	-	-
21	-17	-1442	Jan 22	04:45:20	33880	-42572	P a-	1.0006	1.0141	0.0296	250.9	38.1	-
22	-16	-1424	Feb 02	13:00:08	33506	-42349	P a-	0.9731	1.0618	0.0827	254.5	63.1	-
23	-15	-1406	Feb 12	21:08:15	33134	-42126	P a-	0.9398	1.1203	0.1464	258.9	83.0	-
24	-14	-1388	Feb 24	05:07:51	32764	-41903	P a-	0.8989	1.1926	0.2241	264.1	101.4	-
25	-13	-1370	Mar 06	13:00:47	32397	-41680	P a-	0.8522	1.2757	0.3122	269.8	118.0	-
26	-12	-1352	Mar 16	20:45:21	32031	-41457	P a-	0.7983	1.3724	0.4136	275.9	133.5	-
27	-11	-1334	Mar 28	04:25:02	31668	-41234	P a-	0.7397	1.4776	0.5232	281.9	147.5	-

28	-10	-1316	Apr 07	11:58:29	31307	-41011	P	a-	0.6755	1.5936	0.6430	288.0	160.2	-
29	-09	-1298	Apr 18	19:27:45	30947	-40788	P	a-	0.6072	1.7172	0.7699	293.7	171.4	-
30	-08	-1280	Apr 29	02:53:40	30590	-40565	P	a-	0.5355	1.8474	0.9027	298.9	181.3	-
31	-07	-1262	May 10	10:17:48	30235	-40342	T	a-	0.4618	1.9817	1.0389	303.6	189.6	29.2
32	-06	-1244	May 20	17:41:12	29882	-40119	T	a-	0.3872	2.1180	1.1765	307.6	196.4	59.7
33	-05	-1226	Jun 01	01:04:07	29531	-39896	T	p-	0.3118	2.2560	1.3152	310.9	201.9	76.1
34	-04	-1208	Jun 11	08:29:33	29182	-39673	T+	p-	0.2382	2.3911	1.4502	313.4	205.9	86.6
35	-03	-1190	Jun 22	15:57:31	28835	-39450	T+	p-	0.1662	2.5236	1.5819	315.3	208.8	93.4
36	-02	-1172	Jul 02	23:29:34	28491	-39227	T+	pp	0.0978	2.6498	1.7068	316.5	210.5	97.3
37	-01	-1154	Jul 14	07:06:21	28148	-39004	T+	pp	0.0333	2.7691	1.8241	317.2	211.3	99.0
38	00	-1136	Jul 24	14:49:40	27807	-38781	T-	pp	-0.0257	2.7844	1.8369	317.5	211.2	99.0
39	01	-1118	Aug 04	22:39:39	27469	-38558	T-	pp	-0.0790	2.6880	1.7375	317.5	210.6	97.7
40	02	-1100	Aug 15	06:36:09	27132	-38335	T-	-p	-0.1269	2.6019	1.6481	317.2	209.6	95.4
41	03	-1082	Aug 26	14:41:10	26798	-38112	T-	-p	-0.1674	2.5293	1.5719	316.9	208.4	92.6
42	04	-1064	Sep 05	22:53:51	26465	-37889	T-	-p	-0.2013	2.4690	1.5079	316.7	207.1	89.5
43	05	-1046	Sep 17	07:15:14	26135	-37666	T-	-p	-0.2280	2.4220	1.4570	316.5	206.0	86.6
44	06	-1028	Sep 27	15:42:52	25807	-37443	T-	-p	-0.2493	2.3847	1.4161	316.5	205.0	84.0
45	07	-1010	Oct 09	00:18:52	25481	-37220	T-	-p	-0.2635	2.3604	1.3883	316.7	204.3	82.0
46	08	-0992	Oct 19	08:59:46	25157	-36997	T	-p	-0.2736	2.3435	1.3681	317.0	203.9	80.4
47	09	-0974	Oct 30	17:46:10	24835	-36774	T	-p	-0.2788	2.3354	1.3571	317.5	203.8	79.6
48	10	-0956	Nov 10	02:34:54	24515	-36551	T	-p	-0.2819	2.3309	1.3501	318.1	203.8	79.1
49	11	-0938	Nov 21	11:26:22	24197	-36328	T	-p	-0.2825	2.3310	1.3481	318.7	204.0	79.0
50	12	-0920	Dec 01	20:16:55	23881	-36105	T	-p	-0.2835	2.3299	1.3455	319.4	204.2	78.9
51	13	-0902	Dec 13	05:06:01	23568	-35882	T	-p	-0.2853	2.3272	1.3418	320.0	204.5	78.7
52	14	-0884	Dec 23	13:51:18	23256	-35659	T	-p	-0.2898	2.3192	1.3331	320.5	204.6	78.1
53	15	-0865	Jan 03	22:32:24	22947	-35436	T	-p	-0.2969	2.3062	1.3199	320.9	204.5	77.0
54	16	-0847	Jan 14	07:05:49	22639	-35213	T	-p	-0.3102	2.2817	1.2956	321.0	204.1	74.8
55	17	-0829	Jan 25	15:32:21	22334	-34990	T	-p	-0.3287	2.2477	1.2619	320.9	203.3	71.4

56	18	-0811 Feb 04	23:49:49	22030 -34767	T	-p	-0.3539	2.2012	1.2158	320.5	201.9	66.0
57	19	-0793 Feb 16	07:59:33	21729 -34544	T	-a	-0.3849	2.1440	1.1591	319.7	199.9	57.9
58	20	-0775 Feb 26	15:57:59	21430 -34321	T	-a	-0.4247	2.0709	1.0864	318.3	196.8	43.8
59	21	-0757 Mar 09	23:48:34	21133 -34098	T	-a	-0.4703	1.9871	1.0027	316.2	192.6	8.0
60	22	-0739 Mar 20	07:28:28	20838 -33875	P	-a	-0.5243	1.8880	0.9035	313.3	186.7	-
61	23	-0721 Mar 31	15:01:21	20545 -33652	P	-a	-0.5833	1.7799	0.7951	309.5	179.0	-
62	24	-0703 Apr 10	22:24:03	20254 -33429	P	-a	-0.6499	1.6582	0.6724	304.4	168.6	-
63	25	-0685 Apr 22	05:41:36	19965 -33206	P	-a	-0.7199	1.5305	0.5433	298.1	155.2	-
64	26	-0667 May 02	12:51:31	19678 -32983	P	-a	-0.7954	1.3929	0.4038	290.2	137.2	-
65	27	-0649 May 13	19:57:16	19394 -32760	P	-a	-0.8732	1.2514	0.2598	280.7	112.8	-
66	28	-0631 May 24	02:58:23	19111 -32537	P	-a	-0.9538	1.1051	0.1104	269.2	75.3	-
67	29	-0613 Jun 04	09:57:46	18831 -32314	N	-a	-1.0346	0.9586	-0.0397	255.8	-	-
68	30	-0595 Jun 14	16:55:52	18552 -32091	N	-a	-1.1153	0.8128	-0.1898	240.2	-	-
69	31	-0577 Jun 25	23:53:44	18276 -31868	N	-a	-1.1947	0.6695	-0.3379	222.2	-	-
70	32	-0559 Jul 06	06:53:57	18001 -31645	N	-h	-1.2711	0.5320	-0.4807	201.7	-	-
71	33	-0541 Jul 17	13:57:05	17729 -31422	N	-h	-1.3440	0.4010	-0.6174	178.2	-	-
72	34	-0523 Jul 27	21:04:52	17459 -31199	N	-h	-1.4118	0.2796	-0.7448	151.2	-	-
73	35	-0505 Aug 08	04:17:39	17191 -30976	N	-h	-1.4745	0.1678	-0.8629	118.9	-	-
74	36	-0487 Aug 18	11:37:33	16883 -30753	N	-h	-1.5305	0.0684	-0.9689	76.9	-	-

SAROS SERIES

Saros series 31 contains 73 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-38	-1774 May 30 21:59:04	41125 -46674	Nb	a-	-1.5341	0.0130	-0.9275	30.4	-	-			
02	-37	-1756 Jun 10 05:23:17	40713 -46451	N	a-	-1.4647	0.1411	-0.8010	99.1	-	-			
03	-36	-1738 Jun 21 12:51:55	40303 -46228	N	a-	-1.3987	0.2635	-0.6810	134.1	-	-			
04	-35	-1720 Jul 01 20:22:29	39895 -46005	N	a-	-1.3346	0.3825	-0.5649	160.0	-	-			
05	-34	-1702 Jul 13 03:59:44	39489 -45782	N	a-	-1.2763	0.4912	-0.4597	179.8	-	-			
06	-33	-1684 Jul 23 11:41:29	39086 -45559	N	a-	-1.2223	0.5924	-0.3626	196.0	-	-			
07	-32	-1666 Aug 03 19:30:41	38684 -45336	N	a-	-1.1749	0.6816	-0.2777	208.9	-	-			
08	-31	-1648 Aug 14 03:26:08	38285 -45113	N	a-	-1.1330	0.7609	-0.2032	219.5	-	-			
09	-30	-1630 Aug 25 11:30:27	37888 -44890	N	a-	-1.0988	0.8261	-0.1428	227.8	-	-			
10	-29	-1612 Sep 04 19:41:58	37492 -44667	N	a-	-1.0713	0.8790	-0.0949	234.4	-	-			
11	-28	-1594 Sep 16 04:00:56	37099 -44444	N	a-	-1.0504	0.9198	-0.0590	239.5	-	-			
12	-27	-1576 Sep 26 12:27:13	36708 -44221	N	a-	-1.0362	0.9484	-0.0352	243.3	-	-			
13	-26	-1558 Oct 07 21:00:06	36319 -43998	N	a-	-1.0277	0.9662	-0.0219	245.8	-	-			
14	-25	-1540 Oct 18 05:38:24	35932 -43775	N	a-	-1.0242	0.9747	-0.0176	247.5	-	-			
15	-24	-1522 Oct 29 14:20:14	35547 -43552	N	a-	-1.0241	0.9767	-0.0193	248.5	-	-			
16	-23	-1504 Nov 08 23:05:03	35164 -43329	N	a-	-1.0272	0.9728	-0.0265	248.8	-	-			
17	-22	-1486 Nov 20 07:50:38	34783 -43106	N	a-	-1.0312	0.9667	-0.0353	249.0	-	-			

18	-21	-1468	Nov 30	16:35:04	34404	-42883	N	a-	-1.0351	0.9606	-0.0435	249.1	-	-
19	-20	-1450	Dec 12	01:16:53	34028	-42660	N	a-	-1.0374	0.9573	-0.0484	249.5	-	-
20	-19	-1432	Dec 22	09:54:11	33653	-42437	N	a-	-1.0367	0.9592	-0.0477	250.5	-	-
21	-18	-1413	Jan 02	18:25:14	33281	-42214	N	a-	-1.0317	0.9686	-0.0390	252.2	-	-
22	-17	-1395	Jan 13	02:48:25	32910	-41991	N	a-	-1.0211	0.9883	-0.0198	255.0	-	-
23	-16	-1377	Jan 24	11:03:25	32542	-41768	P	a-	-1.0047	1.0185	0.0104	258.8	23.1	-
24	-15	-1359	Feb 03	19:09:19	32175	-41545	P	a-	-0.9814	1.0613	0.0530	263.8	52.2	-
25	-14	-1341	Feb 15	03:04:22	31811	-41322	P	a-	-0.9502	1.1186	0.1104	270.1	75.0	-
26	-13	-1323	Feb 25	10:49:39	31449	-41099	P	a-	-0.9118	1.1891	0.1807	277.2	95.3	-
27	-12	-1305	Mar 08	18:24:32	31089	-40876	P	h-	-0.8657	1.2737	0.2651	285.2	114.4	-
28	-11	-1287	Mar 19	01:50:47	30731	-40653	P	h-	-0.8132	1.3705	0.3613	293.6	132.2	-
29	-10	-1269	Mar 30	09:06:09	30375	-40430	P	t-	-0.7525	1.4823	0.4723	302.6	149.1	-
30	-09	-1251	Apr 09	16:14:53	30021	-40207	P	t-	-0.6870	1.6031	0.5918	311.3	164.4	-
31	-08	-1233	Apr 20	23:15:03	29669	-39984	P	t-	-0.6155	1.7351	0.7221	320.0	178.3	-
32	-07	-1215	May 01	06:10:12	29320	-39761	P	t-	-0.5406	1.8736	0.8584	328.0	190.6	-
33	-06	-1197	May 12	12:58:45	28972	-39538	T	t-	-0.4610	2.0212	1.0031	335.5	201.4	8.9
34	-05	-1179	May 22	19:45:19	28626	-39315	T	t-	-0.3807	2.1702	1.1489	342.1	210.3	59.0
35	-04	-1161	Jun 03	02:28:57	28283	-39092	T	pp	-0.2990	2.3221	1.2969	347.8	217.5	79.4
36	-03	-1143	Jun 13	09:12:05	27941	-38869	T-	pp	-0.2178	2.4732	1.4437	352.6	223.0	92.1
37	-02	-1125	Jun 24	15:56:01	27602	-38646	T-	pp	-0.1384	2.6214	1.5871	356.3	226.9	99.8
38	-01	-1107	Jul 04	22:42:59	27265	-38423	T-	pp	-0.0627	2.7629	1.7234	359.2	229.2	103.7
39	00	-1089	Jul 16	05:33:52	26929	-38200	T+	pp	0.0092	2.8638	1.8188	361.2	230.2	104.8
40	01	-1071	Jul 26	12:29:15	26596	-37977	T+	pp	0.0762	2.7437	1.6928	362.5	230.0	103.3
41	02	-1053	Aug 06	19:31:19	26265	-37754	T+	pp	0.1368	2.6356	1.5787	363.2	229.0	99.9
42	03	-1035	Aug 17	02:40:40	25936	-37531	T+	pp	0.1904	2.5403	1.4773	363.6	227.3	95.0
43	04	-1017	Aug 28	09:57:18	25609	-37308	T+	-p	0.2373	2.4573	1.3884	363.7	225.2	88.9
44	05	-0999	Sep 07	17:22:36	25284	-37085	T	-p	0.2764	2.3885	1.3136	363.7	223.1	82.3
45	06	-0981	Sep 19	00:56:09	24962	-36862	T	-p	0.3083	2.3328	1.2524	363.7	221.1	75.6

46	07	-0963	Sep 29	08:38:22	24641	-36639	T	-p	0.3322	2.2915	1.2058	363.9	219.4	69.5
47	08	-0945	Oct 10	16:25:57	24322	-36416	T	-p	0.3512	2.2590	1.1687	364.1	218.0	63.8
48	09	-0927	Oct 21	00:21:12	24006	-36193	T	-p	0.3634	2.2387	1.1443	364.5	217.1	59.5
49	10	-0909	Nov 01	08:20:19	23691	-35970	T	-t	0.3722	2.2244	1.1266	365.0	216.5	56.1
50	11	-0891	Nov 11	16:23:41	23379	-35747	T	-t	0.3769	2.2170	1.1166	365.5	216.2	54.1
51	12	-0873	Nov 23	00:26:49	23068	-35524	T	-t	0.3814	2.2096	1.1074	366.0	216.0	52.2
52	13	-0855	Dec 03	08:31:17	22760	-35301	T	-t	0.3845	2.2044	1.1013	366.3	215.8	50.8
53	14	-0837	Dec 14	16:32:33	22454	-35078	T	-t	0.3900	2.1944	1.0912	366.3	215.5	48.4
54	15	-0819	Dec 25	00:30:20	22150	-34855	T	-t	0.3981	2.1792	1.0768	366.0	214.9	44.7
55	16	-0800	Jan 05	08:21:54	21848	-34632	T	-t	0.4111	2.1546	1.0536	365.3	213.7	37.6
56	17	-0782	Jan 15	16:07:18	21548	-34409	T	-t	0.4290	2.1207	1.0217	364.1	211.9	24.2
57	18	-0764	Jan 26	23:43:50	21250	-34186	P	-t	0.4540	2.0735	0.9771	362.2	209.1	-
58	19	-0746	Feb 06	07:11:52	20954	-33963	P	-t	0.4860	2.0132	0.9199	359.5	205.1	-
59	20	-0728	Feb 17	14:30:23	20660	-33740	P	-t	0.5258	1.9385	0.8486	355.9	199.6	-
60	21	-0710	Feb 27	21:40:11	20368	-33517	P	-t	0.5728	1.8505	0.7642	351.3	192.3	-
61	22	-0692	Mar 10	04:39:09	20079	-33294	P	-t	0.6286	1.7462	0.6637	345.3	182.3	-
62	23	-0674	Mar 21	11:30:25	19791	-33071	P	-t	0.6905	1.6308	0.5520	337.9	169.2	-
63	24	-0656	Mar 31	18:12:54	19506	-32848	P	-t	0.7595	1.5023	0.4272	328.8	151.8	-
64	25	-0638	Apr 12	00:50:03	19222	-32625	P	-t	0.8330	1.3656	0.2940	317.9	128.4	-
65	26	-0620	Apr 22	07:19:16	18941	-32402	P	-t	0.9127	1.2177	0.1492	304.6	93.3	-
66	27	-0602	May 03	13:46:32	18662	-32179	P	-t	0.9940	1.0671	0.0015	289.2	9.7	-
67	28	-0584	May 13	20:09:24	18385	-31956	N	-t	1.0784	0.9109	-0.1521	271.0	-	-
68	29	-0566	May 25	02:32:38	18109	-31733	N	-t	1.1626	0.7554	-0.3054	250.2	-	-
69	30	-0548	Jun 04	08:54:40	17836	-31510	N	-t	1.2477	0.5983	-0.4608	225.6	-	-
70	31	-0530	Jun 15	15:20:58	17565	-31287	N	-t	1.3294	0.4476	-0.6101	197.5	-	-
71	32	-0512	Jun 25	21:50:22	17296	-31064	N	-t	1.4085	0.3020	-0.7548	164.1	-	-
72	33	-0494	Jul 07	04:25:22	17009	-30841	N	-t	1.4834	0.1644	-0.8918	122.3	-	-
73	34	-0476	Jul 17	11:07:25	16692	-30618	Ne	-t	1.5527	0.0370	-1.0190	58.5	-	-

SAROS SERIES

32

Saros series 32 contains 73 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-34	-1673 Jun 23	06:33:50	38843	-45424	N t-	1.5143	0.1076	-0.9486	99.5	-	-		
02	-33	-1655 Jul 03	13:10:04	38442	-45201	N t-	1.4430	0.2408	-0.8199	147.6	-	-		
03	-32	-1637 Jul 14	19:49:31	38044	-44978	N t-	1.3742	0.3695	-0.6961	181.3	-	-		
04	-31	-1619 Jul 25	02:36:46	37648	-44755	N t-	1.3116	0.4869	-0.5836	206.4	-	-		
05	-30	-1601 Aug 05	09:30:22	37254	-44532	N t-	1.2539	0.5954	-0.4803	226.6	-	-		
06	-29	-1583 Aug 15	16:33:16	36862	-44309	N t-	1.2037	0.6899	-0.3908	242.4	-	-		
07	-28	-1565 Aug 26	23:43:49	36472	-44086	N t-	1.1597	0.7732	-0.3125	255.1	-	-		
08	-27	-1547 Sep 06	07:04:56	36084	-43863	N t-	1.1239	0.8413	-0.2491	264.9	-	-		
09	-26	-1529 Sep 17	14:34:14	35698	-43640	N t-	1.0946	0.8973	-0.1975	272.6	-	-		

10	-25	-1511	Sep 27	22:11:46	35315	-43417	N	t-	1.0719	0.9409	-0.1578	278.4	-	-
11	-24	-1493	Oct 09	05:57:06	34933	-43194	N	t-	1.0553	0.9730	-0.1291	282.6	-	-
12	-23	-1475	Oct 19	13:49:08	34554	-42971	N	t-	1.0444	0.9942	-0.1104	285.3	-	-
13	-22	-1457	Oct 30	21:46:14	34176	-42748	Nx	t-	1.0372	1.0085	-0.0981	287.2	-	-
14	-21	-1439	Nov 10	05:45:27	33801	-42525	Nx	t-	1.0317	1.0191	-0.0885	288.5	-	-
15	-20	-1421	Nov 21	13:47:24	33427	-42302	Nx	t-	1.0284	1.0253	-0.0824	289.2	-	-
16	-19	-1403	Dec 01	21:48:27	33056	-42079	Nx	t-	1.0246	1.0320	-0.0751	289.8	-	-
17	-18	-1385	Dec 13	05:47:07	32687	-41856	Nx	t-	1.0185	1.0423	-0.0633	290.7	-	-
18	-17	-1367	Dec 23	13:41:14	32320	-41633	Nx	t-	1.0089	1.0588	-0.0444	292.2	-	-
19	-16	-1348	Jan 03	21:30:17	31955	-41410	Nx	t-	0.9948	1.0831	-0.0171	294.4	-	-
20	-15	-1330	Jan 14	05:12:31	31592	-41187	P	t-	0.9750	1.1176	0.0211	297.4	35.8	-
21	-14	-1312	Jan 25	12:46:34	31231	-40964	P	t-	0.9484	1.1643	0.0719	301.4	65.5	-
22	-13	-1294	Feb 04	20:12:33	30872	-40741	P	t-	0.9148	1.2236	0.1359	306.3	89.2	-
23	-12	-1276	Feb 16	03:29:47	30515	-40518	P	t-	0.8737	1.2966	0.2138	312.0	110.4	-
24	-11	-1258	Feb 26	10:37:54	30161	-40295	P	t-	0.8245	1.3843	0.3066	318.3	130.3	-
25	-10	-1240	Mar 08	17:37:53	29808	-40072	P	t-	0.7679	1.4855	0.4129	325.0	148.5	-
26	-09	-1222	Mar 20	00:30:19	29457	-39849	P	t-	0.7045	1.5992	0.5319	331.6	165.1	-
27	-08	-1204	Mar 30	07:16:42	29109	-39626	P	t-	0.6354	1.7235	0.6611	338.0	179.8	-
28	-07	-1186	Apr 10	13:56:04	28762	-39403	P	t-	0.5596	1.8601	0.8025	344.0	193.0	-
29	-06	-1168	Apr 20	20:32:23	28418	-39180	P	t-	0.4805	2.0032	0.9499	349.1	204.1	-
30	-05	-1150	May 02	03:04:31	28076	-38957	T	t-	0.3968	2.1547	1.1054	353.4	213.2	51.4
31	-04	-1132	May 12	09:36:55	27736	-38734	T	t-	0.3126	2.3074	1.2618	356.5	220.2	76.7
32	-03	-1114	May 23	16:07:23	27398	-38511	T+	pp	0.2259	2.4648	1.4224	358.6	225.3	91.5
33	-02	-1096	Jun 02	22:42:11	27062	-38288	T+	pp	0.1417	2.6180	1.5784	359.6	228.3	100.0
34	-01	-1078	Jun 14	05:18:48	26728	-38065	T+	pp	0.0578	2.7708	1.7334	359.4	229.6	104.1
35	00	-1060	Jun 24	12:01:47	26396	-37842	T-	pp	-0.0219	2.8358	1.8002	358.3	229.3	104.6
36	01	-1042	Jul 05	18:49:59	26066	-37619	T-	pp	-0.0981	2.6952	1.6609	356.4	227.6	102.0
37	02	-1024	Jul 16	01:47:20	25738	-37396	T-	pp	-0.1679	2.5666	1.5333	353.8	224.7	96.9

38	03	-1006	Jul 27	08:52:42	25412	-37173	T-	pp	-0.2322	2.4484	1.4157	350.7	221.0	89.6
39	04	-0988	Aug 06	16:07:46	25089	-36950	T	-p	-0.2897	2.3427	1.3103	347.3	216.8	80.3
40	05	-0970	Aug 17	23:32:58	24767	-36727	T	-p	-0.3398	2.2507	1.2185	343.8	212.4	69.3
41	06	-0952	Aug 28	07:09:15	24448	-36504	T	-p	-0.3818	2.1736	1.1414	340.5	208.1	57.0
42	07	-0934	Sep 08	14:55:43	24130	-36281	T	-p	-0.4163	2.1102	1.0781	337.3	204.1	43.1
43	08	-0916	Sep 18	22:52:41	23815	-36058	T	-p	-0.4430	2.0612	1.0291	334.5	200.6	26.7
44	09	-0898	Sep 30	06:59:04	23502	-35835	P	-p	-0.4631	2.0242	0.9925	332.1	197.7	-
45	10	-0880	Oct 10	15:14:44	23191	-35612	P	-p	-0.4763	1.9997	0.9686	330.1	195.6	-
46	11	-0862	Oct 21	23:36:44	22882	-35389	P	-p	-0.4850	1.9832	0.9532	328.3	194.0	-
47	12	-0844	Nov 01	08:06:04	22575	-35166	P	-p	-0.4884	1.9762	0.9477	326.9	193.1	-
48	13	-0826	Nov 12	16:39:08	22270	-34943	P	-p	-0.4892	1.9737	0.9473	325.7	192.5	-
49	14	-0808	Nov 23	01:16:03	21967	-34720	P	-p	-0.4877	1.9751	0.9512	324.6	192.2	-
50	15	-0790	Dec 04	09:52:19	21666	-34497	P	-p	-0.4875	1.9738	0.9532	323.3	191.8	-
51	16	-0772	Dec 14	18:29:45	21367	-34274	P	-p	-0.4871	1.9727	0.9559	322.0	191.5	-
52	17	-0754	Dec 26	03:03:59	21070	-34051	P	-p	-0.4897	1.9658	0.9533	320.5	190.8	-
53	18	-0735	Jan 05	11:34:52	20776	-33828	P	-a	-0.4959	1.9517	0.9442	318.6	189.7	-
54	19	-0717	Jan 16	19:59:49	20483	-33605	P	-a	-0.5077	1.9276	0.9252	316.4	188.0	-
55	20	-0699	Jan 27	04:19:35	20193	-33382	P	-a	-0.5246	1.8938	0.8970	313.7	185.6	-
56	21	-0681	Feb 07	12:32:16	19904	-33159	P	-a	-0.5479	1.8481	0.8570	310.4	182.3	-
57	22	-0663	Feb 17	20:37:27	19618	-32936	P	-a	-0.5780	1.7899	0.8046	306.5	177.8	-
58	23	-0645	Mar 01	04:35:19	19334	-32713	P	-a	-0.6148	1.7195	0.7399	301.9	172.0	-
59	24	-0627	Mar 11	12:26:04	19052	-32490	P	-a	-0.6582	1.6370	0.6631	296.5	164.5	-
60	25	-0609	Mar 22	20:09:33	18772	-32267	P	-a	-0.7081	1.5428	0.5741	290.1	154.9	-
61	26	-0591	Apr 02	03:46:55	18494	-32044	P	-a	-0.7637	1.4383	0.4746	282.6	142.7	-
62	27	-0573	Apr 13	11:18:58	18218	-31821	P	-a	-0.8241	1.3252	0.3660	273.9	127.1	-
63	28	-0555	Apr 23	18:47:12	17944	-31598	P	-a	-0.8882	1.2056	0.2504	264.0	106.7	-
64	29	-0537	May 05	02:11:03	17672	-31375	P	-a	-0.9565	1.0786	0.1268	252.5	77.1	-
65	30	-0519	May 15	09:33:45	17402	-31152	P	-a	-1.0261	0.9494	0.0004	239.6	4.3	-

66	31	-0501	May 26	16:54:48	17135	-30929	N	-a	-1.0977	0.8170	-0.1300	224.9	-	-
67	32	-0483	Jun 06	00:17:31	16816	-30706	N	-a	-1.1681	0.6870	-0.2585	208.6	-	-
68	33	-0465	Jun 17	07:40:20	16505	-30483	N	-a	-1.2388	0.5569	-0.3879	189.9	-	-
69	34	-0447	Jun 27	15:07:55	16203	-30260	N	-a	-1.3061	0.4334	-0.5113	169.4	-	-
70	35	-0429	Jul 08	22:38:41	15908	-30037	N	-a	-1.3714	0.3139	-0.6313	145.6	-	-
71	36	-0411	Jul 19	06:15:21	15622	-29814	N	-a	-1.4320	0.2033	-0.7431	118.3	-	-
72	37	-0393	Jul 30	13:57:23	15343	-29591	N	-a	-1.4886	0.1003	-0.8477	83.9	-	-
73	38	-0375	Aug 09	21:47:02	15070	-29368	Ne	-a	-1.5392	0.0085	-0.9416	24.7	-	-

SAROS SERIES

33

Saros series 33 contains 73 lunar eclipses.

PHASE													
DURATIONS													
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-36	-1662 May 22	07:37:52	38600	-45289	Nb h-	-1.5444	0.0332	-0.9848	53.3	-	-	-

02	-35	-1644	Jun 01	14:25:07	38201	-45066	N	h-	-1.4610	0.1846	-0.8302	123.5	-	-
03	-34	-1626	Jun 12	21:16:44	37804	-44843	N	h-	-1.3797	0.3326	-0.6797	162.9	-	-
04	-33	-1608	Jun 23	04:13:17	37409	-44620	N	h-	-1.3009	0.4761	-0.5342	191.5	-	-
05	-32	-1590	Jul 04	11:17:24	37016	-44397	N	a-	-1.2269	0.6111	-0.3977	213.3	-	-
06	-31	-1572	Jul 14	18:29:38	36626	-44174	N	a-	-1.1584	0.7361	-0.2715	230.3	-	-
07	-30	-1554	Jul 26	01:50:08	36237	-43951	N	a-	-1.0957	0.8510	-0.1560	243.9	-	-
08	-29	-1536	Aug 05	09:20:52	35850	-43728	N	a-	-1.0401	0.9528	-0.0538	254.4	-	-
09	-28	-1518	Aug 16	17:01:46	35466	-43505	P	a-	-0.9918	1.0413	0.0348	262.6	42.6	-
10	-27	-1500	Aug 27	00:53:41	35083	-43282	P	a-	-0.9518	1.1148	0.1084	268.7	74.1	-
11	-26	-1482	Sep 07	08:54:39	34703	-43059	P	a-	-0.9182	1.1763	0.1699	273.3	91.7	-
12	-25	-1464	Sep 17	17:06:04	34325	-42836	P	a-	-0.8927	1.2231	0.2167	276.4	102.5	-
13	-24	-1446	Sep 29	01:26:11	33949	-42613	P	a-	-0.8736	1.2580	0.2518	278.4	109.6	-
14	-23	-1428	Oct 09	09:54:17	33574	-42390	P	a-	-0.8605	1.2818	0.2762	279.4	114.1	-
15	-22	-1410	Oct 20	18:28:57	33202	-42167	P	a-	-0.8523	1.2964	0.2916	279.7	116.7	-
16	-21	-1392	Oct 31	03:08:55	32832	-41944	P	a-	-0.8478	1.3040	0.3006	279.5	118.0	-
17	-20	-1374	Nov 11	11:52:57	32464	-41721	P	a-	-0.8463	1.3058	0.3042	278.8	118.3	-
18	-19	-1356	Nov 21	20:37:47	32098	-41498	P	a-	-0.8449	1.3072	0.3080	278.0	118.7	-
19	-18	-1338	Dec 03	05:23:53	31735	-41275	P	a-	-0.8442	1.3071	0.3108	277.2	118.9	-
20	-17	-1320	Dec 13	14:07:49	31373	-41052	P	a-	-0.8408	1.3116	0.3187	276.7	120.0	-
21	-16	-1302	Dec 24	22:49:06	31013	-40829	P	a-	-0.8350	1.3203	0.3312	276.4	121.9	-
22	-15	-1283	Jan 04	07:24:46	30656	-40606	P	a-	-0.8239	1.3384	0.3536	276.9	125.3	-
23	-14	-1265	Jan 15	15:55:55	30300	-40383	P	a-	-0.8087	1.3640	0.3837	277.9	129.7	-
24	-13	-1247	Jan 26	00:20:11	29947	-40160	P	a-	-0.7871	1.4013	0.4259	279.6	135.5	-
25	-12	-1229	Feb 06	08:36:48	29595	-39937	P	a-	-0.7587	1.4509	0.4803	282.0	142.5	-
26	-11	-1211	Feb 16	16:45:44	29246	-39714	P	a-	-0.7235	1.5131	0.5473	285.0	150.3	-
27	-10	-1193	Feb 28	00:47:14	28899	-39491	P	a-	-0.6817	1.5874	0.6263	288.5	158.5	-
28	-09	-1175	Mar 10	08:41:12	28554	-39268	P	a-	-0.6333	1.6740	0.7174	292.4	167.0	-
29	-08	-1157	Mar 21	16:27:42	28211	-39045	P	a-	-0.5782	1.7731	0.8205	296.5	175.3	-

30	-07	-1139	Apr 01	00:08:17	27870	-38822	P	a-	-0.5178	1.8821	0.9333	300.5	183.2	-
31	-06	-1121	Apr 12	07:43:23	27531	-38599	T	a-	-0.4526	2.0001	1.0543	304.3	190.3	34.3
32	-05	-1103	Apr 22	15:13:16	27194	-38376	T	a-	-0.3827	2.1270	1.1838	307.9	196.6	60.7
33	-04	-1085	May 03	22:40:07	26859	-38153	T	p-	-0.3100	2.2594	1.3182	310.9	201.9	76.4
34	-03	-1067	May 14	06:04:35	26526	-37930	T-	p-	-0.2353	2.3958	1.4559	313.4	206.1	87.0
35	-02	-1049	May 25	13:29:02	26196	-37707	T-	p-	-0.1603	2.5333	1.5938	315.2	209.0	93.9
36	-01	-1031	Jun 04	20:52:22	25867	-37484	T-	pp	-0.0842	2.6729	1.7333	316.4	210.9	98.0
37	00	-1013	Jun 16	04:19:04	25541	-37261	T-	pp	-0.0111	2.8075	1.8671	316.9	211.5	99.5
38	01	-0995	Jun 26	11:47:30	25216	-37038	T+	pp	0.0604	2.7177	1.7758	316.8	211.2	98.6
39	02	-0977	Jul 07	19:21:12	24894	-36815	T+	-p	0.1276	2.5955	1.6516	316.3	209.9	95.8
40	03	-0959	Jul 18	02:58:09	24574	-36592	T+	-p	0.1920	2.4788	1.5322	315.3	207.8	91.1
41	04	-0941	Jul 29	10:43:00	24255	-36369	T+	-p	0.2494	2.3750	1.4251	314.1	205.3	84.8
42	05	-0923	Aug 08	18:33:21	23939	-36146	T	-p	0.3019	2.2805	1.3270	312.8	202.3	77.1
43	06	-0905	Aug 20	02:31:31	23625	-35923	T	-p	0.3474	2.1990	1.2416	311.4	199.2	68.2
44	07	-0887	Aug 30	10:36:45	23313	-35700	T	-p	0.3868	2.1288	1.1672	310.2	196.1	58.1
45	08	-0869	Sep 10	18:50:58	23003	-35477	T	-a	0.4184	2.0729	1.1071	309.2	193.4	47.4
46	09	-0851	Sep 21	03:12:08	22695	-35254	T	-a	0.4437	2.0287	1.0586	308.5	191.0	35.6
47	10	-0833	Oct 02	11:40:17	22390	-35031	T	-a	0.4629	1.9957	1.0214	308.1	189.2	21.8
48	11	-0815	Oct 12	20:14:50	22086	-34808	P	-a	0.4762	1.9732	0.9949	308.1	187.9	-
49	12	-0797	Oct 24	04:55:31	21784	-34585	P	-a	0.4843	1.9601	0.9782	308.4	187.1	-
50	13	-0779	Nov 03	13:39:43	21485	-34362	P	-a	0.4892	1.9528	0.9676	309.0	186.7	-
51	14	-0761	Nov 14	22:27:21	21187	-34139	P	-a	0.4910	1.9509	0.9629	309.7	186.8	-
52	15	-0743	Nov 25	07:15:40	20892	-33916	P	-a	0.4921	1.9501	0.9598	310.5	186.9	-
53	16	-0725	Dec 06	16:04:30	20598	-33693	P	-a	0.4924	1.9505	0.9584	311.3	187.2	-
54	17	-0707	Dec 17	00:49:37	20307	-33470	P	-a	0.4955	1.9454	0.9519	311.9	187.2	-
55	18	-0689	Dec 28	09:32:23	20018	-33247	P	-a	0.5003	1.9371	0.9427	312.4	187.0	-
56	19	-0670	Jan 07	18:08:41	19731	-33024	P	-a	0.5103	1.9190	0.9241	312.5	186.2	-
57	20	-0652	Jan 19	02:38:56	19446	-32801	P	-a	0.5247	1.8926	0.8976	312.2	184.9	-

58	21	-0634	Jan 29	10:59:59	19163	-32578	P	-a	0.5464	1.8529	0.8579	311.3	182.5	-
59	22	-0616	Feb 09	19:13:26	18882	-32355	P	-a	0.5736	1.8028	0.8080	310.0	179.2	-
60	23	-0598	Feb 20	03:16:58	18603	-32132	P	-a	0.6088	1.7383	0.7436	307.8	174.3	-
61	24	-0580	Mar 02	11:10:26	18326	-31909	P	-a	0.6513	1.6600	0.6655	304.6	167.6	-
62	25	-0562	Mar 13	18:54:07	18052	-31686	P	-a	0.7012	1.5685	0.5739	300.4	158.4	-
63	26	-0544	Mar 24	02:28:40	17779	-31463	P	-a	0.7578	1.4649	0.4699	294.9	146.2	-
64	27	-0526	Apr 04	09:54:21	17508	-31240	P	-a	0.8209	1.3495	0.3538	287.9	129.5	-
65	28	-0508	Apr 14	17:11:18	17240	-31017	P	-a	0.8903	1.2228	0.2259	279.0	105.8	-
66	29	-0490	Apr 26	00:21:38	16941	-30794	P	-a	0.9640	1.0882	0.0897	268.2	68.2	-
67	30	-0472	May 06	07:25:39	16627	-30571	N	-a	1.0418	0.9467	-0.0540	255.0	-	-
68	31	-0454	May 17	14:24:22	16321	-30348	N	-h	1.1227	0.7996	-0.2038	238.9	-	-
69	32	-0436	May 27	21:19:39	16024	-30125	N	-h	1.2054	0.6496	-0.3571	219.5	-	-
70	33	-0418	Jun 08	04:12:57	15734	-29902	N	-h	1.2881	0.4997	-0.5108	196.2	-	-
71	34	-0400	Jun 18	11:06:01	15452	-29679	N	-h	1.3698	0.3519	-0.6629	167.8	-	-
72	35	-0382	Jun 29	17:58:40	15177	-29456	N	-h	1.4503	0.2066	-0.8131	130.9	-	-
73	36	-0364	Jul 10	00:54:43	14909	-29233	Ne	-h	1.5266	0.0693	-0.9557	77.1	-	-

SAROS SERIES

34

Saros series 34 contains 72 lunar eclipses.

													PHASE
													DURATIONS
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-37	-1615 May 13	02:56:56	37565 -44708	N	a-	1.4720	0.1273	-0.8140	94.3	-	-	
02	-36	-1597 May 24	10:19:10	37171 -44485	N	a-	1.4020	0.2562	-0.6861	132.3	-	-	
03	-35	-1579 Jun 03	17:41:12	36780 -44262	N	a-	1.3319	0.3858	-0.5583	160.7	-	-	
04	-34	-1561 Jun 15	01:05:21	36390 -44039	N	a-	1.2636	0.5123	-0.4340	183.2	-	-	
05	-33	-1543 Jun 25	08:32:05	36003 -43816	N	a-	1.1976	0.6349	-0.3145	202.0	-	-	
06	-32	-1525 Jul 06	16:02:15	35617 -43593	N	a-	1.1347	0.7521	-0.2009	217.8	-	-	
07	-31	-1507 Jul 16	23:38:10	35234 -43370	N	a-	1.0767	0.8607	-0.0965	231.0	-	-	
08	-30	-1489 Jul 28	07:19:43	34853 -43147	N	a-	1.0234	0.9608	-0.0010	242.3	-	-	
09	-29	-1471 Aug 07	15:08:06	34474 -42924	P	a-	0.9763	1.0497	0.0829	251.6	62.9	-	
10	-28	-1453 Aug 18	23:03:28	34097 -42701	P	a-	0.9355	1.1273	0.1552	259.4	85.4	-	
11	-27	-1435 Aug 29	07:06:57	33722 -42478	P	a-	0.9019	1.1916	0.2142	265.8	99.7	-	
12	-26	-1417 Sep 09	15:17:38	33349 -42255	P	a-	0.8747	1.2442	0.2614	270.9	109.6	-	
13	-25	-1399 Sep 19	23:35:02	32978 -42032	P	a-	0.8536	1.2856	0.2974	275.1	116.6	-	
14	-24	-1381 Oct 01	07:59:35	32609 -41809	P	a-	0.8391	1.3150	0.3216	278.3	121.1	-	
15	-23	-1363 Oct 11	16:30:26	32243 -41586	P	a-	0.8306	1.3329	0.3347	280.7	123.6	-	
16	-22	-1345 Oct 23	01:05:56	31878 -41363	P	a-	0.8263	1.3430	0.3404	282.4	124.8	-	
17	-21	-1327 Nov 02	09:44:53	31515 -41140	P	a-	0.8257	1.3463	0.3396	283.7	125.0	-	
18	-20	-1309 Nov 13	18:25:56	31155 -40917	P	a-	0.8273	1.3449	0.3349	284.6	124.6	-	
19	-19	-1291 Nov 24	03:07:55	30797 -40694	P	a-	0.8304	1.3407	0.3278	285.2	123.7	-	
20	-18	-1273 Dec 05	11:47:27	30440 -40471	P	a-	0.8324	1.3383	0.3231	286.0	123.2	-	
21	-17	-1255 Dec 15	20:24:55	30086 -40248	P	a-	0.8333	1.3375	0.3205	286.9	123.1	-	

22 -16 -1237 Dec 27 04:56:29 29734 -40025 P a- 0.8302 1.3437 0.3255 288.3 124.4 -
 23 -15 -1218 Jan 06 13:22:52 29384 -39802 P a- 0.8237 1.3562 0.3371 290.1 126.7 -
 24 -14 -1200 Jan 17 21:39:45 29036 -39579 P a- 0.8102 1.3811 0.3616 292.9 131.2 -
 25 -13 -1182 Jan 28 05:49:26 28690 -39356 P a- 0.7918 1.4151 0.3953 296.3 136.9 -
 26 -12 -1164 Feb 08 13:48:11 28346 -39133 P a- 0.7657 1.4631 0.4432 300.5 144.3 -
 27 -11 -1146 Feb 18 21:37:17 28004 -38910 P h- 0.7324 1.5242 0.5043 305.6 153.0 -
 28 -10 -1128 Mar 01 05:15:00 27664 -38687 P h- 0.6906 1.6009 0.5808 311.3 162.8 -
 29 -09 -1110 Mar 12 12:43:31 27327 -38464 P t- 0.6423 1.6896 0.6692 317.5 172.8 -
 30 -08 -1092 Mar 22 20:01:47 26991 -38241 P t- 0.5866 1.7922 0.7713 324.0 183.0 -
 31 -07 -1074 Apr 03 03:10:32 26657 -38018 P t- 0.5240 1.9074 0.8856 330.5 192.9 -
 32 -06 -1056 Apr 13 10:10:51 26326 -37795 T t- 0.4553 2.0342 1.0111 336.9 202.1 16.7
 33 -05 -1038 Apr 24 17:04:12 25997 -37572 T t- 0.3815 2.1705 1.1456 342.9 210.4 58.4
 34 -04 -1020 May 04 23:51:22 25669 -37349 T pp 0.3035 2.3147 1.2876 348.3 217.4 78.5
 35 -03 -1002 May 16 06:33:51 25344 -37126 T+ pp 0.2225 2.4648 1.4350 352.9 223.1 91.6
 36 -02 -0984 May 26 13:13:32 25021 -36903 T+ pp 0.1399 2.6179 1.5850 356.6 227.2 99.8
 37 -01 -0966 Jun 06 19:52:04 24700 -36680 T+ pp 0.0570 2.7718 1.7352 359.3 229.6 104.2
 38 00 -0948 Jun 17 02:29:39 24381 -36457 T- pp -0.0258 2.8312 1.7905 361.1 230.5 105.0
 39 01 -0930 Jun 28 09:09:30 24064 -36234 T- pp -0.1060 2.6864 1.6410 361.9 229.8 102.3
 40 02 -0912 Jul 08 15:51:29 23749 -36011 T- pp -0.1836 2.5465 1.4962 361.8 227.7 96.3
 41 03 -0894 Jul 19 22:39:10 23436 -35788 T- p -0.2557 2.4168 1.3612 361.0 224.3 86.9
 42 04 -0876 Jul 30 05:30:24 23125 -35565 T -t -0.3240 2.2942 1.2332 359.6 219.9 73.3
 43 05 -0858 Aug 10 12:30:19 22817 -35342 T -t -0.3846 2.1859 1.1192 357.8 214.8 54.5
 44 06 -0840 Aug 20 19:36:08 22510 -35119 T -t -0.4397 2.0876 1.0153 355.7 209.1 20.2
 45 07 -0822 Sep 01 02:51:34 22206 -34896 P -t -0.4861 2.0053 0.9275 353.7 203.5 -
 46 08 -0804 Sep 11 10:13:52 21903 -34673 P -t -0.5262 1.9344 0.8511 351.8 198.0 -
 47 09 -0786 Sep 22 17:46:08 21603 -34450 P -t -0.5577 1.8791 0.7908 350.3 193.2 -
 48 10 -0768 Oct 03 01:25:14 21304 -34227 P -t -0.5833 1.8345 0.7415 349.0 189.0 -
 49 11 -0750 Oct 14 09:11:50 21008 -34004 P -t -0.6025 1.8014 0.7044 348.1 185.6 -

50	12	-0732	Oct 24	17:04:20	20714	-33781	P	-t	-0.6164	1.7775	0.6771	347.6	183.0	-
51	13	-0714	Nov 05	01:02:41	20422	-33558	P	-t	-0.6249	1.7633	0.6602	347.4	181.4	-
52	14	-0696	Nov 15	09:03:27	20132	-33335	P	-t	-0.6315	1.7521	0.6471	347.2	180.1	-
53	15	-0678	Nov 26	17:05:54	19844	-33112	P	-t	-0.6365	1.7435	0.6375	347.1	179.2	-
54	16	-0660	Dec 07	01:07:43	19558	-32889	P	-t	-0.6417	1.7340	0.6278	346.7	178.2	-
55	17	-0642	Dec 18	09:08:12	19274	-32666	P	-t	-0.6477	1.7226	0.6171	346.1	177.1	-
56	18	-0624	Dec 28	17:03:16	18993	-32443	P	-t	-0.6578	1.7035	0.5993	345.0	175.1	-
57	19	-0605	Jan 09	00:53:54	18713	-32220	P	-t	-0.6712	1.6779	0.5759	343.3	172.3	-
58	20	-0587	Jan 19	08:36:22	18435	-31997	P	-t	-0.6910	1.6401	0.5409	340.7	167.9	-
59	21	-0569	Jan 30	16:12:10	18160	-31774	P	-t	-0.7161	1.5923	0.4964	337.2	162.0	-
60	22	-0551	Feb 09	23:37:28	17886	-31551	P	-t	-0.7495	1.5291	0.4370	332.5	153.4	-
61	23	-0533	Feb 21	06:55:22	17615	-31328	P	-t	-0.7889	1.4548	0.3668	326.6	142.0	-
62	24	-0515	Mar 03	14:03:00	17346	-31105	P	-t	-0.8362	1.3658	0.2820	319.1	126.0	-
63	25	-0497	Mar 14	21:02:14	17068	-30882	P	-t	-0.8906	1.2637	0.1843	309.8	103.3	-
64	26	-0479	Mar 25	03:52:38	16750	-30659	P	-t	-0.9522	1.1486	0.0735	298.4	66.2	-
65	27	-0461	Apr 05	10:36:35	16441	-30436	Nx	-t	-1.0191	1.0236	-0.0472	284.8	-	-
66	28	-0443	Apr 15	17:14:29	16140	-30213	N	-t	-1.0910	0.8898	-0.1771	268.6	-	-
67	29	-0425	Apr 26	23:46:37	15847	-29990	N	-t	-1.1676	0.7473	-0.3157	249.1	-	-
68	30	-0407	May 07	06:15:50	15563	-29767	N	-t	-1.2466	0.6006	-0.4591	225.9	-	-
69	31	-0389	May 18	12:42:56	15285	-29544	N	-t	-1.3277	0.4503	-0.6063	197.9	-	-
70	32	-0371	May 28	19:10:08	15014	-29321	N	-t	-1.4086	0.3005	-0.7535	163.4	-	-
71	33	-0353	Jun 09	01:37:48	14749	-29098	N	-t	-1.4892	0.1515	-0.9003	117.3	-	-
72	34	-0335	Jun 19	08:09:37	14491	-28875	Ne	-t	-1.5668	0.0083	-1.0417	27.7	-	-

SAROS SERIES

35

Saros series 35 contains 72 lunar eclipses.

PHASE													
DURATIONS													
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-34	-1532 May 25	03:39:12	35769	-43681	N t-	-1.5074	0.1193	-0.9347	104.7	-	-	
02	-33	-1514 Jun 05	10:04:48	35385	-43458	N t-	-1.4269	0.2683	-0.7886	155.4	-	-	
03	-32	-1496 Jun 15	16:29:54	35003	-43235	N t-	-1.3460	0.4186	-0.6417	192.0	-	-	
04	-31	-1478 Jun 26	22:59:32	34623	-43012	N t-	-1.2686	0.5624	-0.5016	220.1	-	-	
05	-30	-1460 Jul 07	05:32:38	34245	-42789	N t-	-1.1942	0.7010	-0.3670	243.1	-	-	
06	-29	-1442 Jul 18	12:11:18	33870	-42566	N t-	-1.1243	0.8315	-0.2408	262.0	-	-	
07	-28	-1424 Jul 28	18:57:00	33496	-42343	N t-	-1.0602	0.9513	-0.1254	277.5	-	-	
08	-27	-1406 Aug 09	01:50:47	33124	-42120	Nx t-	-1.0028	1.0588	-0.0223	290.1	-	-	
09	-26	-1388 Aug 19	08:53:39	32755	-41897	P t-	-0.9526	1.1532	0.0676	300.3	63.7	-	
10	-25	-1370 Aug 30	16:04:30	32387	-41674	P t-	-0.9090	1.2354	0.1455	308.6	92.4	-	
11	-24	-1352 Sep 09	23:25:44	32022	-41451	P t-	-0.8739	1.3019	0.2079	315.0	109.6	-	
12	-23	-1334 Sep 21	06:55:23	31658	-41228	P t-	-0.8456	1.3556	0.2580	319.9	121.2	-	
13	-22	-1316 Oct 01	14:33:45	31297	-41005	P t-	-0.8242	1.3963	0.2956	323.5	129.0	-	

14	-21	-1298	Oct 12	22:19:31	30938	-40782	P	t-	-0.8087	1.4261	0.3227	326.1	134.3	-
15	-20	-1280	Oct 23	06:12:46	30581	-40559	P	t-	-0.7989	1.4452	0.3400	327.7	137.4	-
16	-19	-1262	Nov 03	14:10:31	30226	-40336	P	t-	-0.7926	1.4572	0.3509	328.6	139.3	-
17	-18	-1244	Nov 13	22:11:15	29873	-40113	P	t-	-0.7884	1.4651	0.3585	329.0	140.6	-
18	-17	-1226	Nov 25	06:13:34	29522	-39890	P	t-	-0.7851	1.4707	0.3648	329.2	141.6	-
19	-16	-1208	Dec 05	14:16:12	29173	-39667	P	t-	-0.7815	1.4767	0.3721	329.3	142.8	-
20	-15	-1190	Dec 16	22:15:17	28826	-39444	P	t-	-0.7747	1.4880	0.3857	329.6	144.9	-
21	-14	-1172	Dec 27	06:11:00	28481	-39221	P	t-	-0.7648	1.5047	0.4054	330.2	148.0	-
22	-13	-1153	Jan 07	14:00:19	28139	-38998	P	t-	-0.7492	1.5315	0.4360	331.4	152.5	-
23	-12	-1135	Jan 17	21:44:23	27798	-38775	P	t-	-0.7287	1.5668	0.4756	332.9	158.1	-
24	-11	-1117	Jan 29	05:18:25	27460	-38552	P	t-	-0.6996	1.6178	0.5315	335.3	165.4	-
25	-10	-1099	Feb 08	12:46:23	27123	-38329	P	t-	-0.6647	1.6791	0.5980	338.1	173.3	-
26	-09	-1081	Feb 19	20:03:52	26789	-38106	P	t-	-0.6208	1.7569	0.6813	341.4	182.1	-
27	-08	-1063	Mar 02	03:14:46	26457	-37883	P	t-	-0.5707	1.8460	0.7760	344.8	190.8	-
28	-07	-1045	Mar 13	10:15:52	26126	-37660	P	t-	-0.5117	1.9514	0.8871	348.4	199.6	-
29	-06	-1027	Mar 23	17:12:00	25798	-37437	T	t-	-0.4478	2.0660	1.0072	351.7	207.6	13.9
30	-05	-1009	Apr 04	00:00:30	25472	-37214	T	t-	-0.3766	2.1939	1.1405	354.7	214.8	58.6
31	-04	-0991	Apr 14	06:44:32	25148	-36991	T	t-	-0.3006	2.3307	1.2824	357.0	220.8	79.0
32	-03	-0973	Apr 25	13:24:18	24826	-36768	T-	pp	-0.2204	2.4756	1.4320	358.6	225.3	92.1
33	-02	-0955	May 05	20:02:50	24506	-36545	T-	pp	-0.1381	2.6243	1.5851	359.2	228.2	100.2
34	-01	-0937	May 17	02:40:23	24189	-36322	T-	pp	-0.0539	2.7769	1.7416	358.8	229.5	104.2
35	00	-0919	May 27	09:18:34	23873	-36099	T+	pp	0.0307	2.8176	1.7858	357.5	229.1	104.5
36	01	-0901	Jun 07	15:59:41	23559	-35876	T+	pp	0.1139	2.6636	1.6347	355.1	227.1	101.3
37	02	-0883	Jun 17	22:44:43	23248	-35653	T+	pp	0.1944	2.5147	1.4882	351.8	223.5	94.6
38	03	-0865	Jun 29	05:34:31	22938	-35430	T+	pp	0.2718	2.3715	1.3470	347.8	218.7	84.1
39	04	-0847	Jul 09	12:30:58	22631	-35207	T	-p	0.3447	2.2371	1.2140	343.1	212.7	69.0
40	05	-0829	Jul 20	19:35:30	22326	-34984	T	-t	0.4118	2.1135	1.0915	338.1	205.9	46.8
41	06	-0811	Jul 31	02:49:22	22022	-34761	P	-t	0.4717	2.0031	0.9818	332.9	198.7	-

42	07	-0793	Aug 11	10:11:32	21721	-34538	P	-t	0.5257	1.9037	0.8829	327.7	191.2	-
43	08	-0775	Aug 21	17:45:10	21422	-34315	P	-h	0.5711	1.8205	0.7998	322.8	184.0	-
44	09	-0757	Sep 02	01:28:21	21125	-34092	P	-a	0.6095	1.7499	0.7294	318.3	177.3	-
45	10	-0739	Sep 12	09:22:58	20830	-33869	P	-a	0.6394	1.6949	0.6745	314.3	171.5	-
46	11	-0721	Sep 23	17:25:54	20537	-33646	P	-a	0.6633	1.6510	0.6307	310.9	166.5	-
47	12	-0703	Oct 04	01:39:46	20246	-33423	P	-a	0.6791	1.6218	0.6020	308.3	162.9	-
48	13	-0685	Oct 15	10:01:00	19957	-33200	P	-a	0.6898	1.6019	0.5827	306.1	160.3	-
49	14	-0667	Oct 25	18:29:57	19671	-32977	P	-a	0.6950	1.5918	0.5737	304.5	158.8	-
50	15	-0649	Nov 06	03:04:06	19386	-32754	P	-a	0.6968	1.5878	0.5711	303.3	158.1	-
51	16	-0631	Nov 16	11:43:13	19104	-32531	P	-a	0.6954	1.5893	0.5747	302.4	158.0	-
52	17	-0613	Nov 27	20:24:03	18823	-32308	P	-a	0.6931	1.5922	0.5801	301.5	158.2	-
53	18	-0595	Dec 08	05:05:06	18545	-32085	P	-a	0.6915	1.5937	0.5848	300.6	158.3	-
54	19	-0577	Dec 19	13:45:23	18268	-31862	P	-a	0.6911	1.5925	0.5872	299.4	158.2	-
55	20	-0559	Dec 29	22:23:12	17994	-31639	P	-a	0.6938	1.5855	0.5844	298.0	157.5	-
56	21	-0540	Jan 10	06:56:03	17722	-31416	P	-a	0.7011	1.5697	0.5733	296.0	155.9	-
57	22	-0522	Jan 20	15:23:38	17452	-31193	P	-a	0.7133	1.5448	0.5533	293.4	153.3	-
58	23	-0504	Jan 31	23:44:46	17184	-30970	P	-a	0.7317	1.5085	0.5222	290.1	149.3	-
59	24	-0486	Feb 11	07:59:42	16874	-30747	P	-a	0.7559	1.4614	0.4805	286.1	143.8	-
60	25	-0468	Feb 22	16:05:52	16562	-30524	P	-a	0.7881	1.3995	0.4240	281.0	136.0	-
61	26	-0450	Mar 05	00:05:59	16258	-30301	P	-a	0.8260	1.3273	0.3570	275.0	125.8	-
62	27	-0432	Mar 15	07:57:54	15962	-30078	P	-a	0.8713	1.2416	0.2764	267.7	111.8	-
63	28	-0414	Mar 26	15:43:59	15674	-29855	P	-a	0.9220	1.1462	0.1858	259.2	92.7	-
64	29	-0396	Apr 05	23:22:55	15394	-29632	P	-a	0.9792	1.0389	0.0829	249.0	62.7	-
65	30	-0378	Apr 17	06:57:36	15120	-29409	N	-a	1.0404	0.9248	-0.0273	237.1	-	-
66	31	-0360	Apr 27	14:27:25	14853	-29186	N	-a	1.1059	0.8029	-0.1459	223.3	-	-
67	32	-0342	May 08	21:53:46	14592	-28963	N	-a	1.1746	0.6755	-0.2705	207.0	-	-
68	33	-0324	May 19	05:18:17	14338	-28740	N	-a	1.2448	0.5455	-0.3985	188.1	-	-
69	34	-0306	May 30	12:41:55	14089	-28517	N	-a	1.3158	0.4145	-0.5280	165.8	-	-

70	35	-0288	Jun 09	20:06:30	13845	-28294	N	-a	1.3863	0.2848	-0.6570	139.0	-	-
71	36	-0270	Jun 21	03:31:47	13607	-28071	N	-a	1.4562	0.1565	-0.7852	104.2	-	-
72	37	-0252	Jul 01	11:01:10	13373	-27848	Ne	-a	1.5228	0.0347	-0.9076	49.5	-	-

SAROS SERIES

36

Saros series 36 contains 73 lunar eclipses.

													PHASE	
													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-36	-1521	Apr 24	04:57:22	35536	-43546	Nb	h-	1.5463	0.0298	-0.9884	50.4	-	-
02	-35	-1503	May 04	11:48:23	35154	-43323	N	h-	1.4663	0.1742	-0.8392	119.9	-	-
03	-34	-1485	May 15	18:37:55	34773	-43100	N	h-	1.3834	0.3241	-0.6852	160.6	-	-
04	-33	-1467	May 26	01:30:38	34394	-42877	N	h-	1.3017	0.4724	-0.5334	190.3	-	-
05	-32	-1449	Jun 06	08:24:54	34018	-42654	N	h-	1.2195	0.6216	-0.3812	214.2	-	-
06	-31	-1431	Jun 16	15:24:54	33643	-42431	N	a-	1.1409	0.7646	-0.2357	233.3	-	-

07	-30	-1413	Jun 27	22:28:45	33271	-42208	N	a-	1.0642	0.9044	-0.0940	249.1	-	-
08	-29	-1395	Jul 08	05:41:21	32900	-41985	P	a-	0.9934	1.0337	0.0367	261.7	43.8	-
09	-28	-1377	Jul 19	13:00:38	32532	-41762	P	a-	0.9268	1.1554	0.1594	272.1	89.3	-
10	-27	-1359	Jul 29	20:29:17	32166	-41539	P	a-	0.8668	1.2651	0.2696	280.2	114.0	-
11	-26	-1341	Aug 10	04:06:48	31801	-41316	P	a-	0.8133	1.3632	0.3679	286.7	130.8	-
12	-25	-1323	Aug 20	11:54:43	31439	-41093	P	a-	0.7675	1.4472	0.4519	291.6	142.7	-
13	-24	-1305	Aug 31	19:52:34	31079	-40870	P	a-	0.7290	1.5180	0.5225	295.3	151.3	-
14	-23	-1287	Sep 11	03:59:23	30721	-40647	P	a-	0.6969	1.5769	0.5813	298.0	157.7	-
15	-22	-1269	Sep 22	12:16:30	30365	-40424	P	a-	0.6726	1.6216	0.6258	299.7	162.0	-
16	-21	-1251	Oct 02	20:41:49	30012	-40201	P	a-	0.6545	1.6549	0.6592	300.7	164.9	-
17	-20	-1233	Oct 14	05:15:25	29660	-39978	P	a-	0.6425	1.6766	0.6813	301.1	166.6	-
18	-19	-1215	Oct 24	13:54:29	29310	-39755	P	a-	0.6346	1.6907	0.6961	301.1	167.6	-
19	-18	-1197	Nov 04	22:39:11	28963	-39532	P	a-	0.6308	1.6973	0.7037	300.6	167.9	-
20	-17	-1179	Nov 15	07:26:24	28617	-39309	P	a-	0.6286	1.7004	0.7084	300.0	168.0	-
21	-16	-1161	Nov 26	16:15:04	28274	-39086	P	a-	0.6274	1.7015	0.7117	299.3	167.9	-
22	-15	-1143	Dec 07	01:03:16	27932	-38863	P	a-	0.6255	1.7037	0.7165	298.6	168.1	-
23	-14	-1125	Dec 18	09:49:59	27593	-38640	P	a-	0.6225	1.7077	0.7235	298.0	168.4	-
24	-13	-1107	Dec 28	18:32:20	27256	-38417	P	a-	0.6155	1.7189	0.7382	297.8	169.4	-
25	-12	-1088	Jan 09	03:09:49	26920	-38194	P	a-	0.6041	1.7378	0.7610	297.9	171.1	-
26	-11	-1070	Jan 19	11:41:03	26587	-37971	P	a-	0.5874	1.7663	0.7937	298.5	173.5	-
27	-10	-1052	Jan 30	20:06:28	26256	-37748	P	a-	0.5659	1.8037	0.8353	299.4	176.5	-
28	-09	-1034	Feb 10	04:22:42	25927	-37525	P	a-	0.5363	1.8557	0.8917	300.9	180.4	-
29	-08	-1016	Feb 21	12:32:45	25601	-37302	P	a-	0.5015	1.9175	0.9577	302.8	184.7	-
30	-07	-0998	Mar 03	20:33:44	25276	-37079	T	a-	0.4585	1.9942	1.0386	304.9	189.3	29.0
31	-06	-0980	Mar 14	04:29:13	24953	-36856	T	a-	0.4109	2.0798	1.1279	307.2	193.9	51.5
32	-05	-0962	Mar 25	12:15:12	24632	-36633	T	p-	0.3550	2.1806	1.2322	309.6	198.5	67.1
33	-04	-0944	Apr 04	19:57:09	24314	-36410	T	p-	0.2955	2.2882	1.3427	311.8	202.6	78.5
34	-03	-0926	Apr 16	03:31:51	23997	-36187	T+	p-	0.2296	2.4079	1.4649	313.7	206.2	87.5

35	-02	-0908	Apr 26	11:03:25	23683	-35964	T+	p-	0.1610	2.5328	1.5917	315.3	208.9	93.8
36	-01	-0890	May 07	18:30:09	23370	-35741	T+	pp	0.0882	2.6658	1.7259	316.3	210.8	97.8
37	00	-0872	May 18	01:56:11	23060	-35518	T+	pp	0.0148	2.8003	1.8609	316.8	211.6	99.5
38	01	-0854	May 29	09:20:28	22752	-35295	T-	pp	-0.0601	2.7173	1.7776	316.7	211.3	98.8
39	02	-0836	Jun 08	16:45:07	22446	-35072	T-	-p	-0.1345	2.5811	1.6406	315.9	209.9	95.6
40	03	-0818	Jun 20	00:11:00	22142	-34849	T-	-p	-0.2078	2.4475	1.5054	314.6	207.4	89.9
41	04	-0800	Jun 30	07:40:02	21840	-34626	T	-p	-0.2784	2.3190	1.3747	312.7	204.0	81.3
42	05	-0782	Jul 11	15:12:49	21540	-34403	T	-p	-0.3455	2.1973	1.2502	310.4	199.6	69.4
43	06	-0764	Jul 21	22:50:21	21242	-34180	T	-a	-0.4084	2.0835	1.1331	307.8	194.6	52.5
44	07	-0746	Aug 02	06:34:20	20946	-33957	T	-a	-0.4658	1.9802	1.0260	305.1	189.1	24.0
45	08	-0728	Aug 12	14:25:10	20652	-33734	P	-a	-0.5174	1.8877	0.9292	302.3	183.3	-
46	09	-0710	Aug 23	22:22:50	20361	-33511	P	-a	-0.5629	1.8064	0.8435	299.7	177.5	-
47	10	-0692	Sep 03	06:28:25	20071	-33288	P	-a	-0.6016	1.7377	0.7700	297.4	172.0	-
48	11	-0674	Sep 14	14:41:35	19784	-33065	P	-a	-0.6335	1.6816	0.7091	295.5	167.0	-
49	12	-0656	Sep 24	23:02:50	19498	-32842	P	-a	-0.6587	1.6378	0.6606	294.1	162.7	-
50	13	-0638	Oct 06	07:29:39	19215	-32619	P	-a	-0.6789	1.6031	0.6212	293.1	159.1	-
51	14	-0620	Oct 16	16:03:53	18933	-32396	P	-a	-0.6925	1.5803	0.5941	292.7	156.5	-
52	15	-0602	Oct 28	00:42:38	18654	-32173	P	-a	-0.7019	1.5652	0.5750	292.7	154.8	-
53	16	-0584	Nov 07	09:25:57	18377	-31950	P	-a	-0.7071	1.5574	0.5636	293.1	153.8	-
54	17	-0566	Nov 18	18:10:36	18102	-31727	P	-a	-0.7106	1.5524	0.5556	293.7	153.2	-
55	18	-0548	Nov 29	02:56:38	17829	-31504	P	-a	-0.7127	1.5500	0.5506	294.5	153.0	-
56	19	-0530	Dec 10	11:41:22	17558	-31281	P	-a	-0.7153	1.5463	0.5448	295.1	152.7	-
57	20	-0512	Dec 20	20:23:10	17289	-31058	P	-a	-0.7196	1.5391	0.5361	295.5	152.1	-
58	21	-0493	Jan 01	05:00:53	17000	-30835	P	-a	-0.7268	1.5265	0.5223	295.6	150.8	-
59	22	-0475	Jan 11	13:32:46	16684	-30612	P	-a	-0.7381	1.5061	0.5013	295.2	148.6	-
60	23	-0457	Jan 22	21:57:27	16376	-30389	P	-a	-0.7548	1.4755	0.4703	294.1	145.1	-
61	24	-0439	Feb 02	06:13:22	16078	-30166	P	-a	-0.7784	1.4324	0.4271	292.1	139.6	-
62	25	-0421	Feb 13	14:20:42	15787	-29943	P	-a	-0.8081	1.3778	0.3725	289.2	131.8	-

63	26	-0403 Feb 23	22:18:43	15503 -29720	P	-a	-0.8447	1.3107	0.3054	285.2	121.0	-
64	27	-0385 Mar 07	06:05:49	15227 -29497	P	-a	-0.8894	1.2286	0.2232	279.5	105.0	-
65	28	-0367 Mar 17	13:43:49	14958 -29274	P	-a	-0.9408	1.1345	0.1288	272.3	81.1	-
66	29	-0349 Mar 28	21:11:44	14694 -29051	P	-a	-0.9996	1.0269	0.0207	263.1	33.1	-
67	30	-0331 Apr 08	04:31:43	14437 -28828	N	-a	-1.0638	0.9096	-0.0975	251.6	-	-
68	31	-0313 Apr 19	11:41:31	14186 -28605	N	-h	-1.1349	0.7797	-0.2287	236.9	-	-
69	32	-0295 Apr 29	18:45:37	13940 -28382	N	-h	-1.2096	0.6436	-0.3666	219.1	-	-
70	33	-0277 May 11	01:42:39	13700 -28159	N	-h	-1.2888	0.4993	-0.5131	196.5	-	-
71	34	-0259 May 21	08:35:22	13465 -27936	N	-h	-1.3702	0.3514	-0.6637	167.9	-	-
72	35	-0241 Jun 01	15:24:03	13234 -27713	N	-h	-1.4535	0.2003	-0.8183	129.0	-	-
73	36	-0223 Jun 11	22:11:42	13008 -27490	Ne	-t	-1.5362	0.0503	-0.9720	65.8	-	-

SAROS SERIES

37

Saros series 37 contains 72 lunar eclipses.

PHASE													
DURATIONS													
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m

GREATEST

ECLIPSE

01	-38	-1492	Apr 03	16:52:15	34923	-43188	Nb	a-	-1.5316	0.0199	-0.9253	37.6	-	-
02	-37	-1474	Apr 15	00:24:55	34543	-42965	N	a-	-1.4689	0.1345	-0.8099	96.9	-	-
03	-36	-1456	Apr 25	07:52:24	34166	-42742	N	a-	-1.4022	0.2568	-0.6872	132.6	-	-
04	-35	-1438	May 06	15:16:54	33791	-42519	N	a-	-1.3332	0.3835	-0.5608	160.3	-	-
05	-34	-1420	May 16	22:39:01	33417	-42296	N	a-	-1.2628	0.5133	-0.4321	183.5	-	-
06	-33	-1402	May 28	05:59:06	33046	-42073	N	a-	-1.1910	0.6460	-0.3012	203.6	-	-
07	-32	-1384	Jun 07	13:19:54	32677	-41850	N	a-	-1.1200	0.7773	-0.1723	220.9	-	-
08	-31	-1366	Jun 18	20:41:50	32310	-41627	N	a-	-1.0508	0.9060	-0.0466	235.9	-	-
09	-30	-1348	Jun 29	04:07:11	31945	-41404	P	a-	-0.9846	1.0293	0.0730	248.9	59.1	-
10	-29	-1330	Jul 10	11:35:12	31582	-41181	P	a-	-0.9212	1.1477	0.1871	260.3	93.3	-
11	-28	-1312	Jul 20	19:09:34	31221	-40958	P	a-	-0.8638	1.2555	0.2901	269.9	114.7	-
12	-27	-1294	Aug 01	02:49:12	30862	-40735	P	a-	-0.8113	1.3543	0.3838	278.2	130.5	-
13	-26	-1276	Aug 11	10:36:01	30506	-40512	P	a-	-0.7653	1.4415	0.4655	285.2	142.3	-
14	-25	-1258	Aug 22	18:29:17	30151	-40289	P	a-	-0.7252	1.5180	0.5362	291.1	151.4	-
15	-24	-1240	Sep 02	02:31:01	29798	-40066	P	a-	-0.6928	1.5804	0.5929	296.0	158.1	-
16	-23	-1222	Sep 13	10:40:01	29448	-39843	P	a-	-0.6672	1.6304	0.6370	300.1	163.2	-
17	-22	-1204	Sep 23	18:55:38	29100	-39620	P	a-	-0.6478	1.6688	0.6698	303.4	166.8	-
18	-21	-1186	Oct 05	03:18:40	28753	-39397	P	a-	-0.6351	1.6948	0.6904	306.0	169.2	-
19	-20	-1168	Oct 15	11:47:13	28409	-39174	P	a-	-0.6275	1.7113	0.7018	308.1	170.7	-
20	-19	-1150	Oct 26	20:20:47	28067	-38951	P	a-	-0.6250	1.7182	0.7040	309.7	171.4	-
21	-18	-1132	Nov 06	04:56:00	27727	-38728	P	a-	-0.6246	1.7211	0.7028	311.1	171.7	-
22	-17	-1114	Nov 17	13:34:02	27389	-38505	P	a-	-0.6274	1.7178	0.6960	312.1	171.6	-
23	-16	-1096	Nov 27	22:11:08	27053	-38282	P	a-	-0.6298	1.7148	0.6901	313.0	171.5	-
24	-15	-1078	Dec 09	06:46:41	26719	-38059	P	a-	-0.6318	1.7122	0.6852	314.0	171.5	-
25	-14	-1060	Dec 19	15:17:49	26387	-37836	P	a-	-0.6308	1.7150	0.6862	315.2	172.1	-

26 -13 -1042 Dec 30 23:44:18 26057 -37613 P a- -0.6266 1.7233 0.6932 316.7 173.3 -
 27 -12 -1023 Jan 10 08:03:23 25729 -37390 P a- -0.6172 1.7411 0.7102 318.7 175.4 -
 28 -11 -1005 Jan 21 16:14:29 25404 -37167 P a- -0.6017 1.7696 0.7382 321.2 178.6 -
 29 -10 -0987 Feb 01 00:16:18 25080 -36944 P a- -0.5793 1.8109 0.7793 324.3 182.8 -
 30 -09 -0969 Feb 12 08:08:53 24759 -36721 P h- -0.5499 1.8649 0.8332 327.9 187.8 -
 31 -08 -0951 Feb 22 15:49:57 24439 -36498 P t- -0.5119 1.9347 0.9030 332.1 193.8 -
 32 -07 -0933 Mar 05 23:21:26 24122 -36275 P t- -0.4667 2.0176 0.9858 336.5 200.1 -
 33 -06 -0915 Mar 16 06:41:42 23807 -36052 T t- -0.4133 2.1158 1.0838 341.2 206.6 45.1
 34 -05 -0897 Mar 27 13:53:39 23493 -35829 T p- -0.3535 2.2257 1.1932 345.8 212.9 66.3
 35 -04 -0879 Apr 06 20:53:51 23182 -35606 T pp -0.2851 2.3516 1.3183 350.2 218.8 81.7
 36 -03 -0861 Apr 18 03:48:10 22873 -35383 T- pp -0.2128 2.4849 1.4505 354.2 223.7 92.6
 37 -02 -0843 Apr 28 10:33:26 22566 -35160 T- pp -0.1341 2.6300 1.5940 357.5 227.5 100.2
 38 -01 -0825 May 09 17:15:05 22261 -34937 T- pp -0.0532 2.7795 1.7415 359.9 229.9 104.3
 39 00 -0807 May 19 23:50:05 21959 -34714 T+ pp 0.0322 2.8193 1.7787 361.4 230.7 105.0
 40 01 -0789 May 31 06:24:46 21658 -34491 T+ pp 0.1171 2.6651 1.6216 361.9 229.8 101.9
 41 02 -0771 Jun 10 12:56:32 21359 -34268 T+ pp 0.2031 2.5089 1.4619 361.2 227.1 94.4
 42 03 -0753 Jun 21 19:29:40 21062 -34045 T -t 0.2873 2.3564 1.3057 359.5 222.6 81.8
 43 04 -0735 Jul 02 02:03:55 20768 -33822 T -t 0.3697 2.2073 1.1523 356.8 216.3 61.0
 44 05 -0717 Jul 13 08:43:05 20475 -33599 T -t 0.4471 2.0675 1.0080 353.3 208.5 14.6
 45 06 -0699 Jul 23 15:26:44 20185 -33376 P -t 0.5202 1.9359 0.8715 349.1 199.2 -
 46 07 -0681 Aug 03 22:16:33 19897 -33153 P -t 0.5874 1.8152 0.7457 344.5 188.7 -
 47 08 -0663 Aug 14 05:13:56 19610 -32930 P -t 0.6475 1.7075 0.6328 339.7 177.5 -
 48 09 -0645 Aug 25 12:19:19 19326 -32707 P -t 0.7004 1.6131 0.5333 334.9 165.9 -
 49 10 -0627 Sep 04 19:32:58 19044 -32484 P -t 0.7459 1.5320 0.4472 330.5 154.2 -
 50 11 -0609 Sep 16 02:55:10 18764 -32261 P -t 0.7839 1.4647 0.3752 326.5 143.0 -
 51 12 -0591 Sep 26 10:26:19 18486 -32038 P -t 0.8141 1.4115 0.3175 323.2 132.9 -
 52 13 -0573 Oct 07 18:05:34 18210 -31815 P -t 0.8372 1.3712 0.2733 320.6 124.2 -
 53 14 -0555 Oct 18 01:51:10 17936 -31592 P -t 0.8547 1.3407 0.2394 318.6 116.9 -

54	15	-0537	Oct 29	09:43:55	17665	-31369	P	-t	0.8663	1.3209	0.2169	317.4	111.7	-
55	16	-0519	Nov 08	17:41:07	17395	-31146	P	-t	0.8742	1.3074	0.2014	316.5	108.0	-
56	17	-0501	Nov 20	01:41:38	17127	-30923	P	-t	0.8791	1.2989	0.1918	315.9	105.5	-
57	18	-0483	Nov 30	09:42:28	16808	-30700	P	-t	0.8837	1.2906	0.1831	315.3	103.3	-
58	19	-0465	Dec 11	17:43:49	16497	-30477	P	-t	0.8880	1.2824	0.1756	314.5	101.2	-
59	20	-0447	Dec 22	01:42:47	16195	-30254	P	-t	0.8946	1.2697	0.1642	313.2	98.0	-
60	21	-0428	Jan 02	09:37:20	15901	-30031	P	-t	0.9047	1.2500	0.1467	311.2	92.9	-
61	22	-0410	Jan 12	17:26:31	15614	-29808	P	-t	0.9193	1.2219	0.1214	308.3	84.7	-
62	23	-0392	Jan 24	01:08:40	15335	-29585	P	-t	0.9397	1.1826	0.0857	304.1	71.5	-
63	24	-0374	Feb 03	08:43:36	15063	-29362	P	-t	0.9660	1.1323	0.0393	298.6	48.7	-
64	25	-0356	Feb 14	16:09:01	14798	-29139	Nx	-t	1.0003	1.0672	-0.0214	291.3	-	-
65	26	-0338	Feb 24	23:26:47	14538	-28916	N	-t	1.0410	0.9902	-0.0937	282.2	-	-
66	27	-0320	Mar 07	06:35:02	14285	-28693	N	-t	1.0892	0.8992	-0.1798	270.8	-	-
67	28	-0302	Mar 18	13:35:10	14037	-28470	N	-t	1.1441	0.7959	-0.2782	256.7	-	-
68	29	-0284	Mar 28	20:27:03	13794	-28247	N	-t	1.2057	0.6804	-0.3888	239.4	-	-
69	30	-0266	Apr 09	03:12:33	13557	-28024	N	-t	1.2725	0.5555	-0.5090	218.3	-	-
70	31	-0248	Apr 19	09:52:45	13325	-27801	N	-t	1.3438	0.4224	-0.6376	192.2	-	-
71	32	-0230	Apr 30	16:27:36	13097	-27578	N	-t	1.4194	0.2815	-0.7743	158.4	-	-
72	33	-0212	May 10	23:00:42	12874	-27355	N	-t	1.4965	0.1382	-0.9137	112.1	-	-

SAROS SERIES

Saros series 38 contains 72 lunar eclipses.

PHASE													
DURATIONS													
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-34	-1391 Apr 27	00:54:47	32822	-41938	N t-	1.5130	0.1101	-0.9462	100.8	-	-	
02	-33	-1373 May 08	07:20:23	32454	-41715	N t-	1.4334	0.2567	-0.8008	152.3	-	-	
03	-32	-1355 May 18	13:43:17	32089	-41492	N t-	1.3517	0.4076	-0.6516	189.7	-	-	
04	-31	-1337 May 29	20:04:21	31725	-41269	N t-	1.2682	0.5618	-0.4994	220.0	-	-	
05	-30	-1319 Jun 09	02:25:36	31363	-41046	N t-	1.1848	0.7161	-0.3475	245.2	-	-	
06	-29	-1301 Jun 20	08:48:24	31004	-40823	N t-	1.1024	0.8685	-0.1978	266.5	-	-	
07	-28	-1283 Jun 30	15:15:26	30646	-40600	Nx t-	1.0232	1.0155	-0.0540	284.4	-	-	
08	-27	-1265 Jul 11	21:47:47	30291	-40377	P t-	0.9479	1.1553	0.0824	299.4	70.1	-	
09	-26	-1247 Jul 22	04:25:54	29937	-40154	P t-	0.8770	1.2873	0.2108	312.1	110.2	-	
10	-25	-1229 Aug 02	11:11:57	29586	-39931	P t-	0.8123	1.4080	0.3276	322.5	135.1	-	
11	-24	-1211 Aug 12	18:06:30	29237	-39708	P t-	0.7542	1.5165	0.4323	331.0	152.7	-	
12	-23	-1193 Aug 24	01:10:38	28890	-39485	P t-	0.7036	1.6112	0.5233	337.8	165.7	-	
13	-22	-1175 Sep 03	08:23:28	28545	-39262	P t-	0.6599	1.6932	0.6016	343.2	175.4	-	
14	-21	-1157 Sep 14	15:46:36	28202	-39039	P t-	0.6243	1.7603	0.6654	347.4	182.5	-	
15	-20	-1139 Sep 24	23:18:52	27861	-38816	P t-	0.5958	1.8140	0.7161	350.4	187.6	-	
16	-19	-1121 Oct 06	06:59:26	27522	-38593	P t-	0.5741	1.8550	0.7548	352.6	191.2	-	
17	-18	-1103 Oct 16	14:47:56	27185	-38370	P t-	0.5586	1.8844	0.7823	354.1	193.6	-	

18	-17	-1085	Oct 27	22:42:29	26850	-38147	P	t-	0.5479	1.9047	0.8015	354.9	195.1	-
19	-16	-1067	Nov 07	06:42:34	26517	-37924	P	t-	0.5412	1.9171	0.8136	355.2	196.0	-
20	-15	-1049	Nov 18	14:44:07	26187	-37701	P	t-	0.5354	1.9275	0.8245	355.3	196.7	-
21	-14	-1031	Nov 28	22:48:45	25858	-37478	P	t-	0.5317	1.9337	0.8320	355.0	197.1	-
22	-13	-1013	Dec 10	06:51:51	25532	-37255	P	t-	0.5268	1.9415	0.8419	354.7	197.7	-
23	-12	-0995	Dec 20	14:53:25	25208	-37032	P	t-	0.5198	1.9529	0.8563	354.4	198.6	-
24	-11	-0977	Dec 31	22:49:31	24885	-36809	P	t-	0.5079	1.9728	0.8799	354.4	200.2	-
25	-10	-0958	Jan 11	06:41:45	24565	-36586	P	t-	0.4923	1.9992	0.9107	354.5	202.2	-
26	-09	-0940	Jan 22	14:26:36	24247	-36363	P	t-	0.4702	2.0374	0.9538	354.9	204.9	-
27	-08	-0922	Feb 01	22:04:15	23931	-36140	T	t-	0.4417	2.0870	1.0088	355.5	208.2	15.3
28	-07	-0904	Feb 13	05:33:26	23617	-35917	T	t-	0.4057	2.1501	1.0776	356.4	211.9	44.4
29	-06	-0886	Feb 23	12:55:06	23305	-35694	T	t-	0.3627	2.2259	1.1594	357.4	215.9	61.9
30	-05	-0868	Mar 05	20:08:07	22995	-35471	T	t-	0.3121	2.3158	1.2553	358.4	219.8	75.7
31	-04	-0850	Mar 17	03:13:47	22687	-35248	T+	p-	0.2547	2.4181	1.3636	359.2	223.4	86.7
32	-03	-0832	Mar 27	10:12:34	22381	-35025	T+	pp	0.1907	2.5325	1.4839	359.6	226.3	95.2
33	-02	-0814	Apr 07	17:06:23	22078	-34802	T+	pp	0.1220	2.6558	1.6129	359.5	228.3	101.0
34	-01	-0796	Apr 17	23:54:11	21776	-34579	T+	pp	0.0472	2.7904	1.7528	358.7	229.2	104.2
35	00	-0778	Apr 29	06:40:16	21477	-34356	T-	pp	-0.0299	2.8195	1.7868	357.1	228.8	104.4
36	01	-0760	May 09	13:23:29	21179	-34133	T-	pp	-0.1107	2.6690	1.6409	354.6	226.9	101.4
37	02	-0742	May 20	20:08:29	20884	-33910	T-	pp	-0.1908	2.5199	1.4959	351.2	223.5	95.0
38	03	-0724	May 31	02:52:11	20591	-33687	T	pp	-0.2731	2.3672	1.3467	346.8	218.5	84.0
39	04	-0706	Jun 11	09:41:03	20299	-33464	T	-p	-0.3522	2.2205	1.2030	341.7	212.0	67.4
40	05	-0688	Jun 21	16:32:27	20010	-33241	T	-t	-0.4305	2.0756	1.0606	335.7	204.0	38.4
41	06	-0670	Jul 02	23:30:55	19723	-33018	P	-t	-0.5038	1.9401	0.9271	329.2	194.8	-
42	07	-0652	Jul 13	06:34:33	19438	-32795	P	-t	-0.5737	1.8110	0.7995	322.1	184.4	-
43	08	-0634	Jul 24	13:47:57	19155	-32572	P	-t	-0.6366	1.6950	0.6846	315.1	173.4	-
44	09	-0616	Aug 03	21:09:18	18874	-32349	P	-h	-0.6939	1.5896	0.5798	308.0	161.7	-
45	10	-0598	Aug 15	04:40:06	18596	-32126	P	-h	-0.7444	1.4967	0.4874	301.1	149.9	-

46	11	-0580	Aug 25	12:20:21	18319	-31903	P	-a	-0.7879	1.4167	0.4076	294.7	138.3	-
47	12	-0562	Sep 05	20:11:14	18044	-31680	P	-a	-0.8234	1.3516	0.3425	289.1	127.7	-
48	13	-0544	Sep 16	04:11:56	17772	-31457	P	-a	-0.8519	1.2993	0.2902	284.2	118.0	-
49	14	-0526	Sep 27	12:21:37	17501	-31234	P	-a	-0.8738	1.2590	0.2501	280.2	109.9	-
50	15	-0508	Oct 07	20:40:46	17233	-31011	P	-a	-0.8890	1.2311	0.2224	277.1	103.7	-
51	16	-0490	Oct 19	05:07:52	16933	-30788	P	-a	-0.8984	1.2134	0.2054	274.8	99.6	-
52	17	-0472	Oct 29	13:41:34	16618	-30565	P	-a	-0.9033	1.2040	0.1970	273.2	97.4	-
53	18	-0454	Nov 09	22:20:25	16313	-30342	P	-a	-0.9047	1.2008	0.1951	272.1	96.7	-
54	19	-0436	Nov 20	07:03:11	16016	-30119	P	-a	-0.9037	1.2016	0.1979	271.4	97.1	-
55	20	-0418	Dec 01	15:47:52	15726	-29896	P	-a	-0.9018	1.2039	0.2026	270.7	98.0	-
56	21	-0400	Dec 12	00:32:05	15445	-29673	P	-a	-0.9010	1.2038	0.2055	269.9	98.4	-
57	22	-0382	Dec 23	09:15:28	15170	-29450	P	-a	-0.9014	1.2013	0.2064	268.8	98.4	-
58	23	-0363	Jan 02	17:55:51	14902	-29227	P	-a	-0.9045	1.1936	0.2026	267.3	97.3	-
59	24	-0345	Jan 14	02:31:12	14640	-29004	P	-a	-0.9126	1.1767	0.1901	265.1	94.2	-
60	25	-0327	Jan 24	11:00:41	14384	-28781	P	-a	-0.9259	1.1500	0.1680	262.0	88.7	-
61	26	-0309	Feb 04	19:23:44	14134	-28558	P	-a	-0.9448	1.1128	0.1356	258.0	79.9	-
62	27	-0291	Feb 15	03:40:08	13889	-28335	P	-a	-0.9696	1.0648	0.0925	252.9	66.3	-
63	28	-0273	Feb 26	11:47:47	13650	-28112	P	-a	-1.0019	1.0030	0.0357	246.4	41.4	-
64	29	-0255	Mar 08	19:49:00	13416	-27889	N	-a	-1.0400	0.9309	-0.0318	238.5	-	-
65	30	-0237	Mar 20	03:42:06	13186	-27666	N	-a	-1.0853	0.8453	-0.1128	228.7	-	-
66	31	-0219	Mar 30	11:29:13	12961	-27443	N	-a	-1.1359	0.7504	-0.2035	217.1	-	-
67	32	-0201	Apr 10	19:08:52	12741	-27220	N	-a	-1.1929	0.6439	-0.3062	202.8	-	-
68	33	-0183	Apr 21	02:44:46	12525	-26997	N	-a	-1.2534	0.5313	-0.4156	185.9	-	-
69	34	-0165	May 02	10:15:39	12313	-26774	N	-a	-1.3184	0.4107	-0.5335	165.1	-	-
70	35	-0147	May 12	17:43:38	12105	-26551	N	-a	-1.3860	0.2855	-0.6566	139.1	-	-
71	36	-0129	May 24	01:09:34	11900	-26328	N	-a	-1.4555	0.1573	-0.7834	104.4	-	-
72	37	-0111	Jun 03	08:35:04	11699	-26105	Ne	-a	-1.5255	0.0284	-0.9116	44.8	-	-

SAROS SERIES

39

Saros series 39 contains 73 lunar eclipses.

PHASE													
DURATIONS													
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-36	-1380 Mar 26	01:54:14	32599	-41803	Nb h-	-1.5235	0.0736	-0.9487	78.9	-	-	
02	-35	-1362 Apr 06	08:58:11	32233	-41580	N h-	-1.4530	0.1999	-0.8163	128.0	-	-	
03	-34	-1344 Apr 16	15:57:02	31868	-41357	N h-	-1.3770	0.3367	-0.6740	163.3	-	-	
04	-33	-1326 Apr 27	22:54:49	31506	-41134	N a-	-1.2987	0.4776	-0.5279	191.0	-	-	
05	-32	-1308 May 08	05:50:48	31145	-40911	N a-	-1.2177	0.6242	-0.3769	214.3	-	-	
06	-31	-1290 May 19	12:46:57	30787	-40688	N a-	-1.1352	0.7734	-0.2237	233.9	-	-	
07	-30	-1272 May 29	19:45:21	30431	-40465	N a-	-1.0535	0.9217	-0.0720	250.4	-	-	
08	-29	-1254 Jun 10	02:46:55	30077	-40242	P a-	-0.9732	1.0675	0.0767	264.2	62.8	-	
09	-28	-1236 Jun 20	09:53:36	29724	-40019	P a-	-0.8957	1.2086	0.2200	275.7	103.9	-	
10	-27	-1218 Jul 01	17:05:14	29374	-39796	P a-	-0.8213	1.3444	0.3575	285.3	129.4	-	

11	-26	-1200	Jul 12	00:25:01	29026	-39573	P	a-	-0.7525	1.4700	0.4842	292.9	147.2	-
12	-25	-1182	Jul 23	07:51:56	28680	-39350	P	a-	-0.6890	1.5862	0.6012	299.0	160.6	-
13	-24	-1164	Aug 02	15:27:26	28337	-39127	P	a-	-0.6318	1.6910	0.7062	303.8	170.6	-
14	-23	-1146	Aug 13	23:11:41	27995	-38904	P	a-	-0.5811	1.7841	0.7992	307.5	178.1	-
15	-22	-1128	Aug 24	07:06:12	27655	-38681	P	a-	-0.5382	1.8630	0.8778	310.2	183.6	-
16	-21	-1110	Sep 04	15:09:55	27318	-38458	P	a-	-0.5026	1.9284	0.9428	312.0	187.6	-
17	-20	-1092	Sep 14	23:22:40	26982	-38235	P	a-	-0.4740	1.9812	0.9952	313.3	190.4	-
18	-19	-1074	Sep 26	07:44:37	26649	-38012	T	a-	-0.4525	2.0207	1.0343	314.0	192.2	27.8
19	-18	-1056	Oct 06	16:15:04	26317	-37789	T	a-	-0.4375	2.0484	1.0617	314.2	193.3	36.8
20	-17	-1038	Oct 18	00:52:09	25988	-37566	T	a-	-0.4276	2.0665	1.0799	314.1	193.9	41.6
21	-16	-1020	Oct 28	09:35:08	25660	-37343	T	a-	-0.4222	2.0763	1.0901	313.8	194.0	44.0
22	-15	-1002	Nov 08	18:22:14	25335	-37120	T	a-	-0.4197	2.0805	1.0952	313.2	193.9	45.0
23	-14	-0984	Nov 19	03:12:56	25012	-36897	T	a-	-0.4196	2.0799	1.0959	312.5	193.6	45.1
24	-13	-0966	Nov 30	12:03:16	24691	-36674	T	p-	-0.4188	2.0804	1.0982	311.9	193.4	45.6
25	-12	-0948	Dec 10	20:54:20	24372	-36451	T	p-	-0.4183	2.0804	1.1004	311.2	193.3	46.0
26	-11	-0930	Dec 22	05:41:47	24055	-36228	T	p-	-0.4141	2.0866	1.1094	310.8	193.5	47.8
27	-10	-0911	Jan 01	14:26:23	23740	-36005	T	p-	-0.4076	2.0969	1.1228	310.4	194.0	50.4
28	-09	-0893	Jan 12	23:03:50	23428	-35782	T	p-	-0.3948	2.1188	1.1481	310.5	195.0	54.9
29	-08	-0875	Jan 23	07:36:50	23117	-35559	T	p-	-0.3781	2.1476	1.1805	310.7	196.4	60.0
30	-07	-0857	Feb 03	16:01:25	22808	-35336	T	p-	-0.3539	2.1901	1.2268	311.3	198.2	66.3
31	-06	-0839	Feb 14	00:18:53	22502	-35113	T	p-	-0.3237	2.2436	1.2841	312.1	200.4	72.8
32	-05	-0821	Feb 25	08:27:18	22197	-34890	T	p-	-0.2859	2.3111	1.3553	313.1	202.9	79.4
33	-04	-0803	Mar 07	16:28:57	21895	-34667	T-	p-	-0.2422	2.3895	1.4372	314.2	205.3	85.5
34	-03	-0785	Mar 19	00:22:21	21595	-34444	T-	p-	-0.1914	2.4811	1.5320	315.3	207.6	90.9
35	-02	-0767	Mar 29	08:08:40	21296	-34221	T-	p-	-0.1344	2.5843	1.6379	316.2	209.5	95.3
36	-01	-0749	Apr 09	15:48:46	21000	-33998	T-	pp	-0.0721	2.6975	1.7534	316.9	210.9	98.2
37	00	-0731	Apr 19	23:23:47	20706	-33775	T-	pp	-0.0054	2.8189	1.8766	317.1	211.5	99.4
38	01	-0713	May 01	06:53:55	20414	-33552	T+	pp	0.0653	2.7085	1.7673	316.9	211.2	98.6

39	02	-0695	May 11	14:21:08	20124	-33329	T+	-p	0.1387	2.5736	1.6328	316.0	209.8	95.4
40	03	-0677	May 22	21:45:50	19836	-33106	T+	-p	0.2139	2.4358	1.4948	314.4	207.3	89.3
41	04	-0659	Jun 02	05:10:26	19550	-32883	T	-p	0.2890	2.2983	1.3564	312.2	203.5	79.9
42	05	-0641	Jun 13	12:33:47	19267	-32660	T	-a	0.3649	2.1599	1.2164	309.3	198.4	65.3
43	06	-0623	Jun 23	20:00:14	18985	-32437	T	-a	0.4377	2.0274	1.0816	305.9	192.2	41.8
44	07	-0605	Jul 05	03:28:10	18705	-32214	P	-a	0.5086	1.8988	0.9502	301.8	184.7	-
45	08	-0587	Jul 15	11:01:32	18428	-31991	P	-a	0.5747	1.7793	0.8272	297.5	176.3	-
46	09	-0569	Jul 26	18:38:05	18152	-31768	P	-a	0.6374	1.6662	0.7101	292.8	166.8	-
47	10	-0551	Aug 06	02:22:10	17879	-31545	P	-a	0.6933	1.5660	0.6054	288.2	156.9	-
48	11	-0533	Aug 17	10:11:30	17608	-31322	P	-a	0.7441	1.4751	0.5098	283.7	146.4	-
49	12	-0515	Aug 27	18:08:42	17338	-31099	P	-a	0.7878	1.3974	0.4270	279.5	135.9	-
50	13	-0497	Sep 08	02:12:37	17059	-30876	P	-a	0.8256	1.3307	0.3551	275.8	125.5	-
51	14	-0479	Sep 18	10:25:09	16741	-30653	P	-a	0.8560	1.2776	0.2968	272.8	116.0	-
52	15	-0461	Sep 29	18:44:34	16432	-30430	P	-a	0.8799	1.2363	0.2503	270.6	107.5	-
53	16	-0443	Oct 10	03:10:31	16132	-30207	P	-a	0.8982	1.2052	0.2143	269.0	100.2	-
54	17	-0425	Oct 21	11:42:52	15840	-29984	P	-a	0.9107	1.1846	0.1890	268.2	94.6	-
55	18	-0407	Oct 31	20:20:06	15555	-29761	P	-a	0.9192	1.1713	0.1714	268.0	90.6	-
56	19	-0389	Nov 12	05:00:52	15277	-29538	P	-a	0.9241	1.1642	0.1605	268.4	88.0	-
57	20	-0371	Nov 22	13:42:59	15007	-29315	P	-a	0.9275	1.1596	0.1526	268.8	86.1	-
58	21	-0353	Dec 03	22:25:46	14742	-29092	P	-a	0.9299	1.1566	0.1469	269.5	84.8	-
59	22	-0335	Dec 14	07:07:05	14484	-28869	P	-a	0.9331	1.1518	0.1399	269.9	83.0	-
60	23	-0317	Dec 25	15:44:46	14232	-28646	P	-a	0.9386	1.1425	0.1288	270.0	80.0	-
61	24	-0298	Jan 05	00:17:48	13985	-28423	P	-a	0.9476	1.1266	0.1118	269.4	74.9	-
62	25	-0280	Jan 16	08:44:17	13744	-28200	P	-a	0.9613	1.1018	0.0862	268.0	66.2	-
63	26	-0262	Jan 26	17:03:07	13508	-27977	P	-a	0.9807	1.0666	0.0505	265.5	51.1	-
64	27	-0244	Feb 07	01:12:47	13276	-27754	P	-a	1.0070	1.0185	0.0021	261.6	10.6	-
65	28	-0226	Feb 17	09:13:30	13049	-27531	N	-a	1.0399	0.9581	-0.0583	256.2	-	-
66	29	-0208	Feb 28	17:04:34	12827	-27308	N	-a	1.0801	0.8843	-0.1322	248.8	-	-

67	30	-0190	Mar 11	00:44:45	12609	-27085	N	-a	1.1284	0.7958	-0.2209	239.0	-	-
68	31	-0172	Mar 21	08:15:20	12396	-26862	N	-a	1.1835	0.6949	-0.3222	226.4	-	-
69	32	-0154	Apr 01	15:36:03	12186	-26639	N	-h	1.2457	0.5812	-0.4365	210.1	-	-
70	33	-0136	Apr 11	22:48:55	11980	-26416	N	-h	1.3133	0.4575	-0.5611	189.3	-	-
71	34	-0118	Apr 23	05:51:52	11778	-26193	N	-h	1.3877	0.3216	-0.6983	161.4	-	-
72	35	-0100	May 03	12:49:33	11579	-25970	N	-h	1.4651	0.1806	-0.8411	123.0	-	-
73	36	-0082	May 14	19:40:04	11384	-25747	Ne	-t	1.5465	0.0323	-0.9917	52.9	-	-

SAROS SERIES

40

Saros series 40 contains 73 lunar eclipses.

PHASE													
DURATIONS													
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-39	-1369 Feb 24	05:30:25	32377 -41668	N	a-	1.5278	0.0316	-0.9231	47.5	-	-	
02	-38	-1351 Mar 06	13:28:52	32012 -41445	N	a-	1.4866	0.1063	-0.8464	86.5	-	-	

03	-37	-1333	Mar 17	21:17:51	31649	-41222	N	a-	1.4380	0.1945	-0.7564	116.1	-	-
04	-36	-1315	Mar 28	05:00:41	31287	-40999	N	a-	1.3848	0.2914	-0.6581	141.0	-	-
05	-35	-1297	Apr 08	12:36:03	30928	-40776	N	a-	1.3256	0.3997	-0.5490	163.6	-	-
06	-34	-1279	Apr 18	20:07:03	30571	-40553	N	a-	1.2632	0.5140	-0.4344	183.8	-	-
07	-33	-1261	Apr 30	03:31:26	30216	-40330	N	a-	1.1957	0.6380	-0.3108	202.7	-	-
08	-32	-1243	May 10	10:54:04	29863	-40107	N	a-	1.1271	0.7645	-0.1853	219.5	-	-
09	-31	-1225	May 21	18:13:18	29512	-39884	N	a-	1.0558	0.8963	-0.0553	235.0	-	-
10	-30	-1207	Jun 01	01:32:01	29163	-39661	P	a-	0.9844	1.0283	0.0744	248.9	59.7	-
11	-29	-1189	Jun 12	08:50:27	28817	-39438	P	a-	0.9132	1.1606	0.2035	261.4	97.2	-
12	-28	-1171	Jun 22	16:10:57	28472	-39215	P	a-	0.8442	1.2890	0.3283	272.5	121.6	-
13	-27	-1153	Jul 03	23:34:23	28129	-38992	P	a-	0.7782	1.4124	0.4474	282.2	139.7	-
14	-26	-1135	Jul 14	07:00:37	27789	-38769	P	a-	0.7151	1.5306	0.5608	290.8	154.1	-
15	-25	-1117	Jul 25	14:32:32	27451	-38546	P	a-	0.6573	1.6393	0.6642	298.2	165.4	-
16	-24	-1099	Aug 04	22:09:45	27114	-38323	P	a-	0.6044	1.7392	0.7584	304.6	174.5	-
17	-23	-1081	Aug 16	05:54:07	26780	-38100	P	a-	0.5583	1.8268	0.8401	310.0	181.5	-
18	-22	-1063	Aug 26	13:44:42	26448	-37877	P	a-	0.5180	1.9038	0.9110	314.7	187.2	-
19	-21	-1045	Sep 06	21:43:55	26117	-37654	P	a-	0.4854	1.9667	0.9678	318.7	191.5	-
20	-20	-1027	Sep 17	05:49:58	25789	-37431	T	p-	0.4591	2.0181	1.0130	322.1	194.8	17.5
21	-19	-1009	Sep 28	14:03:13	25463	-37208	T	p-	0.4395	2.0571	1.0461	324.9	197.2	32.7
22	-18	-0991	Oct 08	22:22:39	25139	-36985	T	p-	0.4255	2.0856	1.0691	327.3	199.0	39.8
23	-17	-0973	Oct 20	06:48:27	24818	-36762	T	p-	0.4178	2.1023	1.0806	329.3	200.2	43.0
24	-16	-0955	Oct 30	15:17:56	24498	-36539	T	p-	0.4134	2.1128	1.0863	331.0	201.0	44.5
25	-15	-0937	Nov 10	23:50:10	24180	-36316	T	p-	0.4120	2.1173	1.0868	332.5	201.6	44.7
26	-14	-0919	Nov 21	08:23:25	23864	-36093	T	p-	0.4124	2.1185	1.0844	333.9	202.0	44.2
27	-13	-0901	Dec 02	16:56:59	23551	-35870	T	p-	0.4139	2.1171	1.0801	335.1	202.4	43.2
28	-12	-0883	Dec 13	01:26:46	23239	-35647	T	p-	0.4131	2.1197	1.0805	336.4	203.0	43.4
29	-11	-0865	Dec 24	09:53:23	22930	-35424	T	p-	0.4106	2.1252	1.0842	337.7	203.8	44.5
30	-10	-0846	Jan 03	18:12:50	22623	-35201	T	p-	0.4031	2.1396	1.0974	339.3	205.1	47.8

31	-09	-0828	Jan 15	02:26:40	22317	-34978	T	p-	0.3918	2.1607	1.1178	341.1	206.8	52.4
32	-08	-0810	Jan 25	10:29:45	22014	-34755	T	p-	0.3728	2.1957	1.1525	343.3	209.2	59.1
33	-07	-0792	Feb 05	18:25:25	21713	-34532	T	p-	0.3485	2.2403	1.1970	345.7	212.0	66.4
34	-06	-0774	Feb 16	02:09:11	21414	-34309	T	p-	0.3154	2.3010	1.2578	348.4	215.3	74.6
35	-05	-0756	Feb 27	09:43:52	21117	-34086	T	pp	0.2755	2.3741	1.3310	351.2	218.7	82.6
36	-04	-0738	Mar 09	17:06:14	20822	-33863	T+	pp	0.2263	2.4644	1.4214	354.1	222.3	90.3
37	-03	-0720	Mar 20	00:20:20	20529	-33640	T+	pp	0.1711	2.5657	1.5227	356.8	225.6	96.7
38	-02	-0702	Mar 31	07:23:37	20238	-33417	T+	pp	0.1079	2.6818	1.6385	359.2	228.3	101.6
39	-01	-0684	Apr 10	14:18:17	19950	-33194	T+	pp	0.0384	2.8097	1.7658	361.1	230.1	104.5
40	00	-0666	Apr 21	21:04:40	19663	-32971	T-	pp	-0.0372	2.8122	1.7674	362.3	230.8	104.8
41	01	-0648	May 02	03:45:08	19378	-32748	T-	pp	-0.1170	2.6664	1.6204	362.5	230.0	101.8
42	02	-0630	May 13	10:20:00	19096	-32525	T-	pp	-0.2005	2.5142	1.4664	361.7	227.4	94.8
43	03	-0612	May 23	16:50:25	18815	-32302	T	-t	-0.2866	2.3573	1.3073	359.8	222.9	82.0
44	04	-0594	Jun 03	23:19:08	18537	-32079	T	-t	-0.3733	2.1995	1.1468	356.6	216.3	60.1
45	05	-0576	Jun 14	05:47:17	18261	-31856	P	-t	-0.4598	2.0424	0.9867	352.2	207.3	-
46	06	-0558	Jun 25	12:15:47	17987	-31633	P	-t	-0.5451	1.8876	0.8285	346.6	195.9	-
47	07	-0540	Jul 05	18:47:26	17715	-31410	P	-t	-0.6270	1.7392	0.6763	340.0	182.0	-
48	08	-0522	Jul 17	01:23:12	17444	-31187	P	-t	-0.7048	1.5985	0.5315	332.6	165.5	-
49	09	-0504	Jul 27	08:05:25	17176	-30964	P	-t	-0.7768	1.4686	0.3972	324.6	146.4	-
50	10	-0486	Aug 07	14:52:37	16866	-30741	P	-t	-0.8442	1.3472	0.2713	316.0	123.5	-
51	11	-0468	Aug 17	21:49:01	16553	-30518	P	-t	-0.9036	1.2405	0.1600	307.6	96.5	-
52	12	-0450	Aug 29	04:53:05	16249	-30295	P	-t	-0.9565	1.1457	0.0607	299.3	60.3	-
53	13	-0432	Sep 08	12:07:00	15954	-30072	Nx	-t	-1.0010	1.0662	-0.0232	291.8	-	-
54	14	-0414	Sep 19	19:28:59	15666	-29849	N	-t	-1.0387	0.9992	-0.0944	284.9	-	-
55	15	-0396	Sep 30	03:01:04	15386	-29626	N	-t	-1.0682	0.9469	-0.1503	279.3	-	-
56	16	-0378	Oct 11	10:41:00	15113	-29403	N	-t	-1.0911	0.9066	-0.1939	274.7	-	-
57	17	-0360	Oct 21	18:27:46	14846	-29180	N	-t	-1.1082	0.8765	-0.2267	271.2	-	-
58	18	-0342	Nov 02	02:21:05	14585	-28957	N	-t	-1.1200	0.8558	-0.2494	268.6	-	-

59	19	-0324	Nov 12	10:19:00	14331	-28734	N	-t	-1.1276	0.8426	-0.2638	266.9	-	-
60	20	-0306	Nov 23	18:20:07	14082	-28511	N	-t	-1.1328	0.8331	-0.2736	265.7	-	-
61	21	-0288	Dec 04	02:21:11	13838	-28288	N	-t	-1.1380	0.8235	-0.2828	264.2	-	-
62	22	-0270	Dec 15	10:22:56	13600	-28065	N	-t	-1.1425	0.8145	-0.2905	262.8	-	-
63	23	-0252	Dec 25	18:21:48	13367	-27842	N	-t	-1.1490	0.8015	-0.3015	260.7	-	-
64	24	-0233	Jan 06	02:16:29	13138	-27619	N	-t	-1.1592	0.7814	-0.3187	257.5	-	-
65	25	-0215	Jan 16	10:05:16	12914	-27396	N	-t	-1.1740	0.7524	-0.3442	252.9	-	-
66	26	-0197	Jan 27	17:47:49	12695	-27173	N	-t	-1.1942	0.7133	-0.3791	246.7	-	-
67	27	-0179	Feb 07	01:22:56	12480	-26950	N	-t	-1.2204	0.6629	-0.4249	238.4	-	-
68	28	-0161	Feb 18	08:49:27	12268	-26727	N	-t	-1.2535	0.5996	-0.4831	227.5	-	-
69	29	-0143	Feb 28	16:08:07	12061	-26504	N	-t	-1.2932	0.5242	-0.5533	213.6	-	-
70	30	-0125	Mar 11	23:18:18	11857	-26281	N	-t	-1.3398	0.4360	-0.6362	195.8	-	-
71	31	-0107	Mar 22	06:20:20	11657	-26058	N	-t	-1.3931	0.3354	-0.7313	172.8	-	-
72	32	-0089	Apr 02	13:15:17	11461	-25835	N	-t	-1.4522	0.2243	-0.8371	142.2	-	-
73	33	-0071	Apr 12	20:04:09	11267	-25612	Ne	-t	-1.5162	0.1041	-0.9521	97.6	-	-

SAROS SERIES

41

Saros series 41 contains 73 lunar eclipses.

PHASE													
DURATIONS													
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-34	-1268 Mar 18	14:53:58	30356 -40418	Nb	t-	-1.5566	0.0338	-1.0298	56.3	-	-	
02	-33	-1250 Mar 29	21:41:13	30002 -40195	N	t-	-1.4926	0.1509	-0.9121	117.9	-	-	
03	-32	-1232 Apr 09	04:20:37	29650 -39972	N	t-	-1.4225	0.2793	-0.7833	158.9	-	-	
04	-31	-1214 Apr 20	10:52:33	29301 -39749	N	t-	-1.3467	0.4184	-0.6441	192.3	-	-	
05	-30	-1196 Apr 30	17:19:40	28953 -39526	N	t-	-1.2666	0.5654	-0.4974	220.9	-	-	
06	-29	-1178 May 11	23:40:52	28608 -39303	N	t-	-1.1820	0.7211	-0.3424	246.1	-	-	
07	-28	-1160 May 22	06:01:05	28264 -39080	N	t-	-1.0965	0.8785	-0.1861	267.8	-	-	
08	-27	-1142 Jun 02	12:19:16	27923 -38857	Nx	t-	-1.0097	1.0386	-0.0275	286.8	-	-	
09	-26	-1124 Jun 12	18:39:23	27584 -38634	P	t-	-0.9241	1.1965	0.1287	303.0	87.0	-	
10	-25	-1106 Jun 24	01:00:53	27247 -38411	P	t-	-0.8395	1.3529	0.2827	317.1	126.3	-	
11	-24	-1088 Jul 04	07:27:49	26911 -38188	P	t-	-0.7591	1.5017	0.4291	328.8	152.2	-	
12	-23	-1070 Jul 15	13:59:53	26578 -37965	P	t-	-0.6830	1.6428	0.5673	338.6	171.3	-	
13	-22	-1052 Jul 25	20:38:30	26248 -37742	P	t-	-0.6120	1.7745	0.6961	346.6	185.7	-	
14	-21	-1034 Aug 06	03:25:47	25919 -37519	P	t-	-0.5478	1.8939	0.8123	353.0	196.6	-	
15	-20	-1016 Aug 16	10:22:07	25592 -37296	P	t-	-0.4908	2.0000	0.9154	358.0	204.8	-	
16	-19	-0998 Aug 27	17:29:01	25267 -37073	T	t-	-0.4421	2.0910	1.0032	361.8	210.7	9.4	
17	-18	-0980 Sep 07	00:44:39	24944 -36850	T	t-	-0.4002	2.1693	1.0787	364.7	215.2	45.3	
18	-17	-0962 Sep 18	08:11:39	24624 -36627	T	t-	-0.3674	2.2309	1.1376	366.7	218.2	58.7	
19	-16	-0944 Sep 28	15:47:05	24305 -36404	T	p-	-0.3411	2.2803	1.1848	368.0	220.4	66.8	
20	-15	-0926 Oct 09	23:31:57	23989 -36181	T	p-	-0.3221	2.3159	1.2187	368.8	221.7	71.7	
21	-14	-0908 Oct 20	07:23:27	23674 -35958	T	p-	-0.3082	2.3419	1.2437	369.2	222.5	74.9	

22	-13	-0890	Oct 31	15:22:26	23362	-35735	T	p-	-0.2999	2.3574	1.2587	369.2	222.8	76.7
23	-12	-0872	Nov 10	23:25:06	23052	-35512	T	p-	-0.2944	2.3674	1.2691	368.9	223.0	77.8
24	-11	-0854	Nov 22	07:30:50	22744	-35289	T	p-	-0.2908	2.3733	1.2762	368.3	222.9	78.5
25	-10	-0836	Dec 02	15:37:28	22438	-35066	T	p-	-0.2875	2.3784	1.2833	367.6	222.9	79.2
26	-09	-0818	Dec 13	23:44:14	22134	-34843	T	p-	-0.2835	2.3843	1.2919	366.8	222.8	80.1
27	-08	-0800	Dec 24	07:47:01	21832	-34620	T	p-	-0.2758	2.3966	1.3078	366.0	223.1	81.6
28	-07	-0781	Jan 04	15:46:30	21532	-34397	T-	p-	-0.2648	2.4147	1.3302	365.2	223.5	83.7
29	-06	-0763	Jan 14	23:39:44	21234	-34174	T-	p-	-0.2478	2.4434	1.3638	364.5	224.2	86.7
30	-05	-0745	Jan 26	07:28:14	20938	-33951	T-	p-	-0.2260	2.4807	1.4065	363.8	225.1	90.0
31	-04	-0727	Feb 05	15:07:03	20644	-33728	T-	p-	-0.1954	2.5340	1.4656	363.2	226.3	93.9
32	-03	-0709	Feb 16	22:40:19	20353	-33505	T-	pp	-0.1593	2.5970	1.5347	362.5	227.4	97.6
33	-02	-0691	Feb 27	06:03:50	20063	-33282	T-	pp	-0.1144	2.6762	1.6203	361.7	228.5	100.9
34	-01	-0673	Mar 10	13:21:49	19776	-33059	T-	pp	-0.0640	2.7655	1.7159	360.6	229.0	103.3
35	00	-0655	Mar 20	20:30:26	19490	-32836	T-	pp	-0.0049	2.8709	1.8276	359.1	229.0	104.3
36	01	-0637	Apr 01	03:35:09	19207	-32613	T+	pp	0.0585	2.7693	1.7321	357.0	228.1	103.4
37	02	-0619	Apr 11	10:32:48	18926	-32390	T+	pp	0.1284	2.6381	1.6067	354.3	226.0	100.0
38	03	-0601	Apr 22	17:27:36	18647	-32167	T+	pp	0.2017	2.5010	1.4751	350.7	222.7	93.6
39	04	-0583	May 03	00:18:12	18370	-31944	T	pp	0.2792	2.3563	1.3354	346.3	217.8	82.9
40	05	-0565	May 14	07:08:35	18095	-31721	T	-p	0.3576	2.2100	1.1938	340.9	211.4	66.0
41	06	-0547	May 24	13:58:32	17822	-31498	T	-t	0.4374	2.0616	1.0493	334.6	203.1	34.8
42	07	-0529	Jun 04	20:49:51	17551	-31275	P	-t	0.5169	1.9139	0.9052	327.3	193.0	-
43	08	-0511	Jun 15	03:44:34	17282	-31052	P	-t	0.5943	1.7704	0.7647	319.3	181.2	-
44	09	-0493	Jun 26	10:43:43	16992	-30829	P	-t	0.6687	1.6326	0.6293	310.6	167.5	-
45	10	-0475	Jul 06	17:48:55	16676	-30606	P	-t	0.7391	1.5025	0.5011	301.5	152.0	-
46	11	-0457	Jul 18	01:00:32	16368	-30383	P	-h	0.8050	1.3808	0.3807	292.0	134.5	-
47	12	-0439	Jul 28	08:20:41	16070	-30160	P	-h	0.8650	1.2703	0.2713	282.6	115.0	-
48	13	-0421	Aug 08	15:49:35	15779	-29937	P	-a	0.9183	1.1722	0.1737	273.5	93.0	-
49	14	-0403	Aug 18	23:27:10	15496	-29714	P	-a	0.9653	1.0858	0.0876	264.8	66.6	-

50	15	-0385	Aug 30	07:14:57	15220	-29491	P	-a	1.0048	1.0133	0.0151	257.0	27.9	-
51	16	-0367	Sep 09	15:12:35	14950	-29268	N	-a	1.0371	0.9540	-0.0442	250.2	-	-
52	17	-0349	Sep 20	23:20:20	14688	-29045	N	-a	1.0618	0.9088	-0.0896	244.6	-	-
53	18	-0331	Oct 01	07:36:21	14431	-28822	N	-a	1.0806	0.8744	-0.1240	240.1	-	-
54	19	-0313	Oct 12	16:01:16	14179	-28599	N	-a	1.0927	0.8520	-0.1462	236.9	-	-
55	20	-0295	Oct 23	00:33:28	13934	-28376	N	-a	1.0998	0.8388	-0.1590	234.8	-	-
56	21	-0277	Nov 03	09:11:34	13694	-28153	N	-a	1.1028	0.8329	-0.1641	233.5	-	-
57	22	-0259	Nov 13	17:54:25	13458	-27930	N	-a	1.1026	0.8326	-0.1632	232.8	-	-
58	23	-0241	Nov 25	02:40:10	13228	-27707	N	-a	1.1010	0.8347	-0.1593	232.4	-	-
59	24	-0223	Dec 05	11:27:58	13002	-27484	N	-a	1.0982	0.8388	-0.1531	232.3	-	-
60	25	-0205	Dec 16	20:14:13	12781	-27261	N	-a	1.0976	0.8385	-0.1507	231.6	-	-
61	26	-0187	Dec 27	04:59:55	12564	-27038	N	-a	1.0981	0.8359	-0.1500	230.7	-	-
62	27	-0168	Jan 07	13:41:22	12351	-26815	N	-a	1.1030	0.8251	-0.1572	228.9	-	-
63	28	-0150	Jan 17	22:18:32	12143	-26592	N	-a	1.1119	0.8069	-0.1715	226.2	-	-
64	29	-0132	Jan 29	06:48:46	11937	-26369	N	-a	1.1270	0.7770	-0.1972	222.0	-	-
65	30	-0114	Feb 08	15:13:23	11736	-26146	N	-a	1.1473	0.7376	-0.2322	216.6	-	-
66	31	-0096	Feb 19	23:30:26	11538	-25923	N	-a	1.1744	0.6855	-0.2799	209.4	-	-
67	32	-0078	Mar 02	07:39:19	11343	-25700	N	-a	1.2085	0.6207	-0.3403	200.1	-	-
68	33	-0060	Mar 12	15:40:39	11151	-25477	N	-a	1.2492	0.5440	-0.4128	188.4	-	-
69	34	-0042	Mar 23	23:34:46	10962	-25254	N	-a	1.2959	0.4562	-0.4967	173.6	-	-
70	35	-0024	Apr 03	07:22:00	10776	-25031	N	-a	1.3486	0.3578	-0.5915	155.0	-	-
71	36	-0006	Apr 14	15:02:35	10592	-24808	N	-a	1.4069	0.2493	-0.6970	130.5	-	-
72	37	0012	Apr 24	22:38:24	10410	-24585	N	-a	1.4693	0.1335	-0.8101	96.4	-	-
73	38	0030	May 06	06:10:02	10231	-24362	Ne	-a	1.5348	0.0122	-0.9295	29.4	-	-

SAROS SERIES

42

Saros series 42 contains 74 lunar eclipses.

													PHASE
													DURATIONS
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
													GREATEST
													ECLIPSE
01	-37	-1275 Feb 04	06:43:19	30496 -40506	N	a-	1.5391	0.0551	-0.9871	69.0	-	-	
02	-36	-1257 Feb 15	14:24:00	30141 -40283	N	a-	1.5001	0.1232	-0.9123	102.1	-	-	
03	-35	-1239 Feb 25	21:57:46	29789 -40060	N	a-	1.4547	0.2033	-0.8255	129.6	-	-	
04	-34	-1221 Mar 09	05:23:26	29439 -39837	N	a-	1.4017	0.2970	-0.7251	154.6	-	-	
05	-33	-1203 Mar 19	12:43:30	29090 -39614	N	a-	1.3431	0.4013	-0.6143	177.1	-	-	
06	-32	-1185 Mar 30	19:57:23	28744 -39391	N	a-	1.2781	0.5174	-0.4920	197.9	-	-	
07	-31	-1167 Apr 10	03:06:40	28400 -39168	N	a-	1.2083	0.6426	-0.3610	216.8	-	-	
08	-30	-1149 Apr 21	10:11:37	28058 -38945	N	a-	1.1339	0.7765	-0.2217	234.0	-	-	
09	-29	-1131 May 01	17:15:07	27717 -38722	N	a-	1.0569	0.9152	-0.0781	249.3	-	-	
10	-28	-1113 May 13	00:17:25	27379 -38499	P	a-	0.9778	1.0581	0.0691	262.9	59.6	-	
11	-27	-1095 May 23	07:19:50	27044 -38276	P	a-	0.8976	1.2035	0.2183	274.7	103.4	-	
12	-26	-1077 Jun 03	14:24:28	26710 -38053	P	a-	0.8180	1.3479	0.3658	284.8	130.6	-	
13	-25	-1059 Jun 13	21:32:25	26378 -37830	P	a-	0.7398	1.4901	0.5105	293.4	150.4	-	

14	-24	-1041	Jun 25	04:45:24	26048	-37607	P	a-	0.6650	1.6265	0.6488	300.4	165.4	-
15	-23	-1023	Jul 05	12:03:02	25721	-37384	P	a-	0.5929	1.7582	0.7818	306.1	177.0	-
16	-22	-1005	Jul 16	19:28:37	25395	-37161	P	a-	0.5263	1.8798	0.9043	310.6	185.8	-
17	-21	-0987	Jul 27	03:01:33	25071	-36938	T	a-	0.4647	1.9928	1.0175	314.1	192.6	20.1
18	-20	-0969	Aug 07	10:42:59	24750	-36715	T	a-	0.4096	2.0940	1.1187	316.6	197.6	50.6
19	-19	-0951	Aug 17	18:33:21	24431	-36492	T	a-	0.3611	2.1832	1.2075	318.5	201.2	64.9
20	-18	-0933	Aug 29	02:33:22	24113	-36269	T	p-	0.3200	2.2588	1.2825	319.7	203.8	73.7
21	-17	-0915	Sep 08	10:43:07	23798	-36046	T	p-	0.2864	2.3210	1.3438	320.4	205.5	79.3
22	-16	-0897	Sep 19	19:00:27	23485	-35823	T+	p-	0.2584	2.3726	1.3947	320.8	206.6	83.2
23	-15	-0879	Sep 30	03:27:21	23174	-35600	T+	p-	0.2381	2.4103	1.4317	320.9	207.3	85.6
24	-14	-0861	Oct 11	12:01:11	22865	-35377	T+	p-	0.2234	2.4376	1.4584	320.8	207.6	87.2
25	-13	-0843	Oct 21	20:42:26	22558	-35154	T+	p-	0.2143	2.4544	1.4750	320.6	207.6	88.0
26	-12	-0825	Nov 02	05:27:24	22253	-34931	T+	p-	0.2082	2.4656	1.4862	320.2	207.5	88.5
27	-11	-0807	Nov 12	14:17:34	21950	-34708	T+	p-	0.2060	2.4694	1.4905	319.8	207.4	88.6
28	-10	-0789	Nov 23	23:09:09	21650	-34485	T+	p-	0.2048	2.4710	1.4931	319.3	207.2	88.7
29	-09	-0771	Dec 04	08:01:46	21351	-34262	T+	p-	0.2043	2.4712	1.4948	318.8	207.0	88.7
30	-08	-0753	Dec 15	16:52:28	21055	-34039	T+	p-	0.2021	2.4744	1.4998	318.3	206.9	88.9
31	-07	-0735	Dec 26	01:41:18	20760	-33816	T+	p-	0.1980	2.4806	1.5083	317.9	207.0	89.3
32	-06	-0716	Jan 06	10:25:02	20468	-33593	T+	p-	0.1897	2.4946	1.5249	317.6	207.2	90.2
33	-05	-0698	Jan 16	19:03:39	20177	-33370	T+	p-	0.1768	2.5167	1.5501	317.5	207.7	91.4
34	-04	-0680	Jan 28	03:35:20	19889	-33147	T+	p-	0.1582	2.5493	1.5858	317.4	208.3	92.9
35	-03	-0662	Feb 07	12:00:48	19603	-32924	T+	p-	0.1344	2.5913	1.6310	317.5	209.1	94.6
36	-02	-0644	Feb 18	20:16:34	19319	-32701	T+	p-	0.1024	2.6484	1.6914	317.6	209.9	96.4
37	-01	-0626	Mar 01	04:25:36	19037	-32478	T+	pp	0.0646	2.7161	1.7622	317.8	210.6	97.9
38	00	-0608	Mar 11	12:25:26	18757	-32255	T+	pp	0.0193	2.7979	1.8468	317.8	211.1	98.9
39	01	-0590	Mar 22	20:19:18	18479	-32032	T-	pp	-0.0309	2.7753	1.8267	317.6	211.2	98.9
40	02	-0572	Apr 02	04:03:37	18203	-31809	T-	pp	-0.0890	2.6677	1.7212	317.1	210.7	97.5
41	03	-0554	Apr 13	11:43:42	17929	-31586	T-	p	-0.1506	2.5539	1.6090	316.2	209.4	94.4

42	04	-0536	Apr 23	19:16:29	17657	-31363	T	-p	-0.2184	2.4290	1.4851	314.6	207.0	88.7
43	05	-0518	May 05	02:46:09	17388	-31140	T	-p	-0.2884	2.3002	1.3567	312.5	203.5	79.9
44	06	-0500	May 15	10:10:36	17119	-30917	T	-a	-0.3627	2.1641	1.2203	309.6	198.6	65.8
45	07	-0482	May 26	17:34:51	16799	-30694	T	-a	-0.4368	2.0284	1.0838	306.0	192.4	42.4
46	08	-0464	Jun 06	00:56:59	16488	-30471	P	-a	-0.5126	1.8902	0.9439	301.5	184.4	-
47	09	-0446	Jun 17	08:20:03	16187	-30248	P	-a	-0.5873	1.7543	0.8058	296.3	174.8	-
48	10	-0428	Jun 27	15:44:26	15893	-30025	P	-a	-0.6606	1.6214	0.6699	290.4	163.3	-
49	11	-0410	Jul 08	23:12:12	15607	-29802	P	-a	-0.7306	1.4947	0.5397	283.9	149.9	-
50	12	-0392	Jul 19	06:43:43	15328	-29579	P	-a	-0.7969	1.3750	0.4159	277.0	134.3	-
51	13	-0374	Jul 30	14:19:32	15056	-29356	P	-a	-0.8591	1.2632	0.2996	269.8	116.2	-
52	14	-0356	Aug 09	22:01:56	14791	-29133	P	-a	-0.9154	1.1624	0.1938	262.7	95.1	-
53	15	-0338	Aug 21	05:50:30	14531	-28910	P	-a	-0.9662	1.0718	0.0979	255.7	68.7	-
54	16	-0320	Aug 31	13:46:13	14278	-28687	P	-a	-1.0103	0.9937	0.0143	249.2	26.6	-
55	17	-0302	Sep 11	21:49:04	14030	-28464	N	-a	-1.0480	0.9274	-0.0576	243.3	-	-
56	18	-0284	Sep 22	05:59:57	13788	-28241	N	-a	-1.0785	0.8743	-0.1163	238.5	-	-
57	19	-0266	Oct 03	14:17:30	13551	-28018	N	-a	-1.1031	0.8320	-0.1642	234.6	-	-
58	20	-0248	Oct 13	22:41:01	13318	-27795	N	-a	-1.1223	0.7993	-0.2021	231.6	-	-
59	21	-0230	Oct 25	07:10:31	13091	-27572	N	-a	-1.1361	0.7764	-0.2299	229.6	-	-
60	22	-0212	Nov 04	15:44:57	12868	-27349	N	-a	-1.1451	0.7621	-0.2486	228.7	-	-
61	23	-0194	Nov 16	00:22:07	12649	-27126	N	-a	-1.1518	0.7520	-0.2627	228.2	-	-
62	24	-0176	Nov 26	09:00:50	12435	-26903	N	-a	-1.1565	0.7450	-0.2731	228.1	-	-
63	25	-0158	Dec 07	17:39:19	12224	-26680	N	-a	-1.1609	0.7383	-0.2826	228.0	-	-
64	26	-0140	Dec 18	02:16:49	12018	-26457	N	-a	-1.1656	0.7309	-0.2923	227.8	-	-
65	27	-0122	Dec 29	10:49:20	11815	-26234	N	-a	-1.1735	0.7172	-0.3077	226.7	-	-
66	28	-0103	Jan 08	19:17:49	11616	-26011	N	-a	-1.1840	0.6986	-0.3276	224.9	-	-
67	29	-0085	Jan 20	03:38:16	11419	-25788	N	-a	-1.2003	0.6691	-0.3579	221.5	-	-
68	30	-0067	Jan 30	11:52:04	11226	-25565	N	-a	-1.2211	0.6311	-0.3964	216.6	-	-
69	31	-0049	Feb 10	19:55:00	11036	-25342	N	-a	-1.2500	0.5783	-0.4494	209.1	-	-

70	32	-0031	Feb 21	03:49:48	10849	-25119	N	-a	-1.2843	0.5153	-0.5125	199.2	-	-
71	33	-0013	Mar 04	11:33:13	10664	-24896	N	-a	-1.3268	0.4373	-0.5906	185.5	-	-
72	34	0005	Mar 14	19:06:49	10482	-24673	N	-h	-1.3763	0.3466	-0.6814	167.1	-	-
73	35	0023	Mar 26	02:29:29	10301	-24450	N	-h	-1.4336	0.2416	-0.7867	141.4	-	-
74	36	0041	Apr 05	09:43:36	10123	-24227	N	-h	-1.4966	0.1263	-0.9026	103.6	-	-

SAROS SERIES

43

Saros series 43 contains 85 lunar eclipses.

													PHASE	
													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-51	-1463 Sep 07	07:21:03	34304	-42824	N	a-	-1.5290	0.0344	-0.9300	49.7	-	-	
02	-50	-1445 Sep 18	15:45:52	33928	-42601	N	a-	-1.5050	0.0793	-0.8869	75.1	-	-	
03	-49	-1427 Sep 29	00:19:20	33554	-42378	N	a-	-1.4879	0.1116	-0.8563	88.8	-	-	
04	-48	-1409 Oct 10	08:59:12	33182	-42155	N	a-	-1.4762	0.1337	-0.8357	97.0	-	-	

05	-47	-1391	Oct 20	17:44:35	32812	-41932	N	a-	-1.4691	0.1474	-0.8232	101.6	-	-
06	-46	-1373	Nov 01	02:34:39	32445	-41709	N	a-	-1.4660	0.1536	-0.8179	103.7	-	-
07	-45	-1355	Nov 11	11:27:53	32079	-41486	N	a-	-1.4654	0.1549	-0.8170	104.1	-	-
08	-44	-1337	Nov 22	20:21:56	31715	-41263	N	a-	-1.4658	0.1542	-0.8177	103.8	-	-
09	-43	-1319	Dec 03	05:15:37	31354	-41040	N	a-	-1.4660	0.1535	-0.8179	103.6	-	-
10	-42	-1301	Dec 14	14:07:05	30994	-40817	N	a-	-1.4647	0.1555	-0.8150	104.2	-	-
11	-41	-1283	Dec 24	22:55:33	30637	-40594	N	a-	-1.4612	0.1612	-0.8079	106.1	-	-
12	-40	-1264	Jan 05	07:37:57	30281	-40371	N	a-	-1.4531	0.1753	-0.7922	110.5	-	-
13	-39	-1246	Jan 15	16:14:59	29928	-40148	N	a-	-1.4408	0.1968	-0.7688	116.9	-	-
14	-38	-1228	Jan 27	00:44:05	29577	-39925	N	a-	-1.4224	0.2295	-0.7341	125.9	-	-
15	-37	-1210	Feb 06	09:05:31	29227	-39702	N	a-	-1.3983	0.2727	-0.6889	136.7	-	-
16	-36	-1192	Feb 17	17:17:45	28880	-39479	N	a-	-1.3671	0.3290	-0.6306	149.5	-	-
17	-35	-1174	Feb 28	01:22:02	28535	-39256	N	a-	-1.3299	0.3962	-0.5615	163.2	-	-
18	-34	-1156	Mar 10	09:17:47	28192	-39033	N	a-	-1.2861	0.4760	-0.4802	177.7	-	-
19	-33	-1138	Mar 21	17:04:37	27851	-38810	N	a-	-1.2355	0.5682	-0.3868	192.6	-	-
20	-32	-1120	Apr 01	00:44:09	27513	-38587	N	a-	-1.1795	0.6707	-0.2837	207.5	-	-
21	-31	-1102	Apr 12	08:16:37	27176	-38364	N	a-	-1.1182	0.7830	-0.1711	222.1	-	-
22	-30	-1084	Apr 22	15:43:46	26841	-38141	N	a-	-1.0528	0.9031	-0.0514	236.1	-	-
23	-29	-1066	May 03	23:04:58	26509	-37918	P	a-	-0.9831	1.0316	0.0761	249.5	60.4	-
24	-28	-1048	May 14	06:23:49	26178	-37695	P	a-	-0.9119	1.1631	0.2060	261.9	97.8	-
25	-27	-1030	May 25	13:39:43	25850	-37472	P	a-	-0.8389	1.2983	0.3388	273.4	123.4	-
26	-26	-1012	Jun 04	20:55:08	25523	-37249	P	a-	-0.7660	1.4334	0.4709	283.7	143.0	-
27	-25	-0994	Jun 16	04:10:15	25199	-37026	P	a-	-0.6933	1.5687	0.6026	293.1	158.9	-
28	-24	-0976	Jun 26	11:27:46	24877	-36803	P	a-	-0.6233	1.6992	0.7289	301.4	171.7	-
29	-23	-0958	Jul 07	18:47:50	24556	-36580	P	a-	-0.5561	1.8250	0.8499	308.6	182.2	-
30	-22	-0940	Jul 18	02:11:29	24238	-36357	P	a-	-0.4927	1.9440	0.9636	315.0	190.6	-
31	-21	-0922	Jul 29	09:40:35	23922	-36134	T	a-	-0.4346	2.0534	1.0673	320.4	197.4	39.2
32	-20	-0904	Aug 08	17:15:34	23608	-35911	T	p-	-0.3825	2.1521	1.1600	325.1	202.7	58.8

33	-19	-0886	Aug 20	00:57:26	23296	-35688	T	p-	-0.3367	2.2393	1.2409	329.1	206.8	70.4
34	-18	-0868	Aug 30	08:46:03	22987	-35465	T	p-	-0.2976	2.3143	1.3095	332.6	210.1	78.0
35	-17	-0850	Sep 10	16:42:17	22679	-35242	T-	p-	-0.2657	2.3761	1.3649	335.5	212.5	83.2
36	-16	-0832	Sep 21	00:45:45	22373	-35019	T-	p-	-0.2407	2.4251	1.4076	338.1	214.4	86.6
37	-15	-0814	Oct 02	08:55:19	22070	-34796	T-	p-	-0.2217	2.4630	1.4395	340.4	215.8	88.9
38	-14	-0796	Oct 12	17:11:53	21768	-34573	T-	p-	-0.2092	2.4888	1.4595	342.5	216.9	90.4
39	-13	-0778	Oct 24	01:33:16	21469	-34350	T-	p-	-0.2013	2.5060	1.4716	344.3	217.8	91.2
40	-12	-0760	Nov 03	09:59:25	21171	-34127	T-	p-	-0.1982	2.5140	1.4749	345.9	218.4	91.6
41	-11	-0742	Nov 14	18:26:35	20876	-33904	T-	p-	-0.1965	2.5191	1.4759	347.4	219.0	91.8
42	-10	-0724	Nov 25	02:56:08	20583	-33681	T-	pp	-0.1976	2.5188	1.4722	348.8	219.5	91.8
43	-09	-0706	Dec 06	11:23:41	20292	-33458	T-	pp	-0.1973	2.5208	1.4714	350.1	220.1	91.9
44	-08	-0688	Dec 16	19:49:12	20003	-33235	T-	pp	-0.1962	2.5239	1.4724	351.4	220.7	92.2
45	-07	-0670	Dec 28	04:08:55	19715	-33012	T-	pp	-0.1908	2.5346	1.4816	352.8	221.6	93.0
46	-06	-0651	Jan 07	12:23:33	19431	-32789	T-	pp	-0.1820	2.5512	1.4973	354.2	222.6	94.1
47	-05	-0633	Jan 18	20:29:55	19148	-32566	T-	pp	-0.1669	2.5791	1.5247	355.7	223.8	95.8
48	-04	-0615	Jan 29	04:27:32	18867	-32343	T-	pp	-0.1455	2.6185	1.5640	357.2	225.2	97.9
49	-03	-0597	Feb 09	12:14:58	18588	-32120	T-	pp	-0.1163	2.6720	1.6177	358.8	226.8	100.2
50	-02	-0579	Feb 19	19:52:35	18312	-31897	T-	pp	-0.0799	2.7386	1.6845	360.3	228.3	102.3
51	-01	-0561	Mar 03	03:18:46	18037	-31674	T-	pp	-0.0349	2.8210	1.7674	361.7	229.5	104.0
52	00	-0543	Mar 13	10:34:57	17764	-31451	T+	pp	0.0177	2.8524	1.7991	362.8	230.3	104.5
53	01	-0525	Mar 24	17:40:25	17494	-31228	T+	pp	0.0782	2.7412	1.6882	363.3	230.3	103.3
54	02	-0507	Apr 04	00:37:41	17226	-31005	T+	pp	0.1448	2.6190	1.5661	363.2	229.2	99.7
55	03	-0489	Apr 15	07:24:17	16924	-30782	T+	pp	0.2193	2.4824	1.4292	362.1	226.5	92.3
56	04	-0471	Apr 25	14:04:56	16610	-30559	T	-t	0.2979	2.3385	1.2848	360.0	222.2	79.6
57	05	-0453	May 06	20:38:09	16305	-30336	T	-t	0.3816	2.1853	1.1306	356.7	215.6	57.0
58	06	-0435	May 17	03:08:27	16008	-30113	P	-t	0.4672	2.0289	0.9728	352.0	206.5	-
59	07	-0417	May 28	09:33:18	15719	-29890	P	-t	0.5564	1.8662	0.8083	345.7	194.3	-
60	08	-0399	Jun 07	15:58:54	15437	-29667	P	-t	0.6442	1.7062	0.6462	338.1	179.0	-

61	09	-0381	Jun 18	22:23:07	15162	-29444	P	-t	0.7319	1.5466	0.4839	328.9	159.3	-
62	10	-0363	Jun 29	04:50:17	14894	-29221	P	-t	0.8164	1.3929	0.3274	318.5	134.4	-
63	11	-0345	Jul 10	11:19:10	14633	-28998	P	-t	0.8989	1.2433	0.1745	306.7	100.5	-
64	12	-0327	Jul 20	17:54:25	14377	-28775	P	-t	0.9753	1.1048	0.0324	294.1	44.2	-
65	13	-0309	Aug 01	00:35:07	14127	-28552	N	-t	1.0465	0.9761	-0.1001	280.8	-	-
66	14	-0291	Aug 11	07:22:49	13883	-28329	N	-t	1.1114	0.8591	-0.2210	267.0	-	-
67	15	-0273	Aug 22	14:19:01	13644	-28106	N	-t	1.1687	0.7559	-0.3282	253.5	-	-
68	16	-0255	Sep 01	21:24:15	13409	-27883	N	-t	1.2183	0.6668	-0.4211	240.5	-	-
69	17	-0237	Sep 13	04:39:20	13180	-27660	N	-t	1.2598	0.5925	-0.4991	228.6	-	-
70	18	-0219	Sep 23	12:02:43	12955	-27437	N	-t	1.2943	0.5309	-0.5642	217.9	-	-
71	19	-0201	Oct 04	19:36:11	12735	-27214	N	-t	1.3207	0.4841	-0.6140	209.1	-	-
72	20	-0183	Oct 15	03:17:24	12519	-26991	N	-t	1.3408	0.4484	-0.6522	202.0	-	-
73	21	-0165	Oct 26	11:06:14	12307	-26768	N	-t	1.3549	0.4235	-0.6791	196.8	-	-
74	22	-0147	Nov 05	19:00:56	12099	-26545	N	-t	1.3645	0.4066	-0.6973	193.0	-	-
75	23	-0129	Nov 17	03:01:11	11895	-26322	N	-t	1.3700	0.3968	-0.7076	190.7	-	-
76	24	-0111	Nov 27	11:03:39	11694	-26099	N	-t	1.3737	0.3898	-0.7142	189.0	-	-
77	25	-0093	Dec 08	19:07:08	11496	-25876	N	-t	1.3768	0.3834	-0.7194	187.3	-	-
78	26	-0075	Dec 19	03:09:50	11302	-25653	N	-t	1.3808	0.3752	-0.7256	185.2	-	-
79	27	-0057	Dec 30	11:10:48	11111	-25430	N	-t	1.3866	0.3631	-0.7350	182.0	-	-
80	28	-0038	Jan 09	19:06:08	10923	-25207	N	-t	1.3970	0.3423	-0.7523	176.6	-	-
81	29	-0020	Jan 21	02:56:51	10737	-24984	N	-t	1.4112	0.3140	-0.7764	169.2	-	-
82	30	-0002	Jan 31	10:39:52	10554	-24761	N	-t	1.4320	0.2736	-0.8121	158.1	-	-
83	31	0016	Feb 11	18:17:06	10372	-24538	N	-t	1.4576	0.2239	-0.8567	143.2	-	-
84	32	0034	Feb 22	01:44:01	10193	-24315	N	-t	1.4918	0.1584	-0.9166	120.7	-	-
85	33	0052	Mar 04	09:05:07	10016	-24092	N	-t	1.5311	0.0835	-0.9858	87.9	-	-

SAROS SERIES

44

Saros series 44 contains 76 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-35	-1199 Jan 06	03:55:50	29017	-39567	N t-	1.5724	0.0121	-1.0659	33.7	-	-		
02	-34	-1181 Jan 17	11:47:28	28671	-39344	N t-	1.5576	0.0389	-1.0387	60.3	-	-		
03	-33	-1163 Jan 27	19:30:11	28327	-39121	N t-	1.5366	0.0771	-0.9997	84.7	-	-		
04	-32	-1145 Feb 08	03:02:17	27986	-38898	N t-	1.5076	0.1298	-0.9459	109.6	-	-		
05	-31	-1127 Feb 18	10:24:38	27646	-38675	N t-	1.4714	0.1954	-0.8789	133.9	-	-		
06	-30	-1109 Mar 01	17:35:13	27308	-38452	N t-	1.4266	0.2770	-0.7959	158.5	-	-		
07	-29	-1091 Mar 12	00:36:33	26973	-38229	N t-	1.3747	0.3716	-0.6999	182.3	-	-		
08	-28	-1073 Mar 23	07:27:29	26640	-38006	N t-	1.3148	0.4809	-0.5893	205.5	-	-		
09	-27	-1055 Apr 02	14:09:22	26308	-37783	N t-	1.2477	0.6033	-0.4656	227.8	-	-		
10	-26	-1037 Apr 13	20:43:24	25979	-37560	N t-	1.1743	0.7376	-0.3305	248.9	-	-		
11	-25	-1019 Apr 24	03:11:14	25652	-37337	N t-	1.0957	0.8813	-0.1861	268.4	-	-		
12	-24	-1001 May 05	09:34:43	25327	-37114	Nx t-	1.0136	1.0320	-0.0352	286.2	-	-		
13	-23	-0983 May 15	15:53:33	25004	-36891	P t-	0.9274	1.1901	0.1229	302.5	85.2	-		

14 -22 -0965 May 26 22:11:59 24683 -36668 P t- 0.8405 1.3498 0.2820 316.7 126.2 -

15 -21 -0947 Jun 06 04:29:37 24364 -36445 P t- 0.7525 1.5118 0.4432 329.2 154.4 -

16 -20 -0929 Jun 17 10:49:50 24047 -36222 P t- 0.6663 1.6706 0.6007 339.8 175.3 -

17 -19 -0911 Jun 27 17:11:41 23732 -35999 P t- 0.5812 1.8275 0.7561 348.7 191.6 -

18 -18 -0893 Jul 08 23:40:22 23419 -35776 P t- 0.5012 1.9753 0.9020 355.8 203.8 -

19 -17 -0875 Jul 19 06:14:08 23109 -35553 T t- 0.4249 2.1164 1.0410 361.5 213.3 33.2

20 -16 -0857 Jul 30 12:56:04 22800 -35330 T t- 0.3548 2.2462 1.1683 365.8 220.2 64.5

21 -15 -0839 Aug 09 19:45:55 22494 -35107 T t- 0.2910 2.3646 1.2843 369.0 225.2 80.3

22 -14 -0821 Aug 21 02:46:38 22189 -34884 T+ pp 0.2358 2.4671 1.3843 371.2 228.5 89.7

23 -13 -0803 Aug 31 09:56:42 21887 -34661 T+ pp 0.1876 2.5567 1.4715 372.7 230.7 95.7

24 -12 -0785 Sep 11 17:16:40 21587 -34438 T+ pp 0.1470 2.6322 1.5449 373.5 232.0 99.4

25 -11 -0767 Sep 22 00:46:46 21288 -34215 T+ pp 0.1142 2.6934 1.6041 373.9 232.7 101.5

26 -10 -0749 Oct 03 08:27:00 20992 -33992 T+ pp 0.0893 2.7400 1.6491 373.9 232.9 102.7

27 -09 -0731 Oct 13 16:15:18 20698 -33769 T+ pp 0.0704 2.7751 1.6833 373.7 232.9 103.3

28 -08 -0713 Oct 25 00:11:45 20406 -33546 T+ pp 0.0577 2.7986 1.7063 373.2 232.6 103.6

29 -07 -0695 Nov 04 08:14:04 20116 -33323 T+ pp 0.0491 2.8142 1.7222 372.6 232.3 103.6

30 -06 -0677 Nov 15 16:21:53 19829 -33100 T+ pp 0.0445 2.8222 1.7312 371.8 232.0 103.6

31 -05 -0659 Nov 26 00:30:37 19543 -32877 T+ pp 0.0401 2.8293 1.7401 370.9 231.6 103.6

32 -04 -0641 Dec 07 08:42:05 19259 -32654 T+ pp 0.0374 2.8331 1.7465 369.8 231.2 103.6

33 -03 -0623 Dec 17 16:51:14 18977 -32431 T+ pp 0.0327 2.8400 1.7567 368.6 230.9 103.6

34 -02 -0605 Dec 29 00:58:47 18698 -32208 T+ pp 0.0258 2.8506 1.7714 367.3 230.5 103.6

35 -01 -0586 Jan 08 09:00:11 18420 -31985 T+ pp 0.0133 2.8711 1.7966 365.9 230.1 103.7

36 00 -0568 Jan 19 16:58:05 18145 -31762 T- pp -0.0026 2.8880 1.8189 364.4 229.7 103.8

37 01 -0550 Jan 30 00:48:18 17872 -31539 T- pp -0.0252 2.8436 1.7803 362.7 229.2 103.6

38 02 -0532 Feb 10 08:31:35 17600 -31316 T- pp -0.0544 2.7869 1.7298 360.8 228.5 103.0

39 03 -0514 Feb 20 16:06:46 17331 -31093 T- pp -0.0908 2.7169 1.6661 358.7 227.4 101.7

40 04 -0496 Mar 02 23:35:06 17051 -30870 T- pp -0.1340 2.6343 1.5901 356.1 225.8 99.2

41 05 -0478 Mar 14 06:55:55 16733 -30647 T- pp -0.1841 2.5392 1.5015 353.2 223.5 95.0

42	06	-0460	Mar 24	14:10:02	16424	-30424	T-	pp	-0.2405	2.4323	1.4011	349.6	220.2	88.3
43	07	-0442	Apr 04	21:18:27	16124	-30201	T	-p	-0.3027	2.3151	1.2900	345.3	215.8	78.2
44	08	-0424	Apr 15	04:22:11	15832	-29978	T	-p	-0.3698	2.1890	1.1698	340.1	209.9	62.2
45	09	-0406	Apr 26	11:21:26	15547	-29755	T	-t	-0.4415	2.0547	1.0409	334.1	202.4	31.7
46	10	-0388	May 06	18:18:57	15270	-29532	P	-t	-0.5156	1.9163	0.9075	327.0	193.0	-
47	11	-0370	May 18	01:15:00	14999	-29309	P	-t	-0.5918	1.7741	0.7698	319.0	181.5	-
48	12	-0352	May 28	08:12:29	14735	-29086	P	-t	-0.6677	1.6329	0.6326	310.0	167.7	-
49	13	-0334	Jun 08	15:10:15	14477	-28863	P	-t	-0.7442	1.4908	0.4938	300.0	150.9	-
50	14	-0316	Jun 18	22:12:43	14225	-28640	P	-h	-0.8177	1.3546	0.3604	289.4	131.1	-
51	15	-0298	Jun 30	05:18:17	13979	-28417	P	-h	-0.8896	1.2215	0.2295	277.8	106.3	-
52	16	-0280	Jul 10	12:30:42	13737	-28194	P	-h	-0.9565	1.0980	0.1078	266.0	73.8	-
53	17	-0262	Jul 21	19:48:21	13501	-27971	N	-a	-1.0198	0.9812	-0.0079	253.7	-	-
54	18	-0244	Aug 01	03:15:32	13270	-27748	N	-a	-1.0763	0.8771	-0.1112	241.7	-	-
55	19	-0226	Aug 12	10:50:16	13043	-27525	N	-a	-1.1276	0.7828	-0.2052	229.8	-	-
56	20	-0208	Aug 22	18:34:35	12821	-27302	N	-a	-1.1720	0.7013	-0.2866	218.6	-	-
57	21	-0190	Sep 03	02:28:11	12604	-27079	N	-a	-1.2096	0.6323	-0.3558	208.4	-	-
58	22	-0172	Sep 13	10:31:52	12390	-26856	N	-a	-1.2398	0.5771	-0.4113	199.7	-	-
59	23	-0154	Sep 24	18:44:55	12181	-26633	N	-a	-1.2635	0.5338	-0.4549	192.3	-	-
60	24	-0136	Oct 05	03:05:50	11975	-26410	N	-a	-1.2817	0.5005	-0.4885	186.4	-	-
61	25	-0118	Oct 16	11:35:43	11773	-26187	N	-a	-1.2935	0.4790	-0.5101	182.3	-	-
62	26	-0100	Oct 26	20:12:08	11574	-25964	N	-a	-1.3006	0.4659	-0.5230	179.6	-	-
63	27	-0082	Nov 07	04:54:46	11379	-25741	N	-a	-1.3034	0.4605	-0.5278	178.2	-	-
64	28	-0064	Nov 17	13:40:41	11186	-25518	N	-a	-1.3040	0.4588	-0.5285	177.5	-	-
65	29	-0046	Nov 28	22:30:03	10997	-25295	N	-a	-1.3026	0.4607	-0.5252	177.5	-	-
66	30	-0028	Dec 09	07:19:38	10810	-25072	N	-a	-1.3014	0.4619	-0.5221	177.3	-	-
67	31	-0010	Dec 20	16:08:29	10626	-24849	N	-a	-1.3012	0.4610	-0.5205	176.7	-	-
68	32	0008	Dec 31	00:54:48	10444	-24626	N	-a	-1.3035	0.4553	-0.5234	175.3	-	-
69	33	0027	Jan 11	09:37:50	10264	-24403	N	-a	-1.3087	0.4442	-0.5313	173.0	-	-

70	34	0045	Jan 21	18:14:53	10086	-24180	N	-a	-1.3193	0.4229	-0.5490	168.8	-	-
71	35	0063	Feb 02	02:46:05	9909	-23957	N	-a	-1.3352	0.3919	-0.5762	162.7	-	-
72	36	0081	Feb 12	11:10:06	9734	-23734	N	-a	-1.3572	0.3496	-0.6146	154.0	-	-
73	37	0099	Feb 23	19:27:49	9561	-23511	N	-a	-1.3845	0.2976	-0.6628	142.5	-	-
74	38	0117	Mar 06	03:36:01	9388	-23288	N	-a	-1.4199	0.2306	-0.7259	126.0	-	-
75	39	0135	Mar 17	11:38:17	9216	-23065	N	-a	-1.4604	0.1545	-0.7984	103.7	-	-
76	40	0153	Mar 27	19:31:47	9044	-22842	Ne	-a	-1.5084	0.0647	-0.8849	67.6	-	-

SAROS SERIES

45

Saros series 45 contains 85 lunar eclipses.

PHASE													
DURATIONS													
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-40	-1351 Aug 29	23:35:55	32002	-41439	N t-	-1.5496	0.0504	-1.0208	68.4	-	-	
02	-39	-1333 Sep 10	07:07:49	31639	-41216	N t-	-1.5132	0.1177	-0.9544	103.8	-	-	

03	-38	-1315	Sep 20	14:49:53	31278	-40993	N	t-	-1.4839	0.1719	-0.9009	124.5	-	-
04	-37	-1297	Oct 01	22:42:18	30919	-40770	N	h-	-1.4620	0.2121	-0.8610	137.5	-	-
05	-36	-1279	Oct 12	06:42:34	30562	-40547	N	h-	-1.4454	0.2425	-0.8305	146.2	-	-
06	-35	-1261	Oct 23	14:51:04	30207	-40324	N	h-	-1.4347	0.2618	-0.8104	151.3	-	-
07	-34	-1243	Nov 02	23:05:17	29854	-40101	N	h-	-1.4275	0.2744	-0.7965	154.2	-	-
08	-33	-1225	Nov 14	07:23:21	29503	-39878	N	a-	-1.4225	0.2824	-0.7863	155.8	-	-
09	-32	-1207	Nov 24	15:43:55	29154	-39655	N	a-	-1.4187	0.2880	-0.7780	156.8	-	-
10	-31	-1189	Dec 06	00:04:43	28807	-39432	N	a-	-1.4141	0.2947	-0.7677	157.9	-	-
11	-30	-1171	Dec 16	08:24:29	28463	-39209	N	a-	-1.4080	0.3037	-0.7545	159.6	-	-
12	-29	-1153	Dec 27	16:39:56	28120	-38986	N	a-	-1.3976	0.3204	-0.7329	163.0	-	-
13	-28	-1134	Jan 07	00:52:06	27780	-38763	N	a-	-1.3836	0.3433	-0.7046	167.6	-	-
14	-27	-1116	Jan 18	08:57:49	27441	-38540	N	a-	-1.3635	0.3772	-0.6647	174.4	-	-
15	-26	-1098	Jan 28	16:56:55	27105	-38317	N	a-	-1.3372	0.4222	-0.6134	182.9	-	-
16	-25	-1080	Feb 09	00:48:15	26771	-38094	N	a-	-1.3039	0.4801	-0.5489	193.1	-	-
17	-24	-1062	Feb 19	08:32:50	26439	-37871	N	a-	-1.2640	0.5499	-0.4724	204.3	-	-
18	-23	-1044	Mar 01	16:10:21	26109	-37648	N	a-	-1.2172	0.6324	-0.3833	216.2	-	-
19	-22	-1026	Mar 12	23:39:59	25781	-37425	N	a-	-1.1629	0.7288	-0.2804	228.8	-	-
20	-21	-1008	Mar 23	07:04:02	25455	-37202	N	a-	-1.1029	0.8356	-0.1672	241.2	-	-
21	-20	-0990	Apr 03	14:22:14	25131	-36979	N	a-	-1.0370	0.9535	-0.0433	253.3	-	-
22	-19	-0972	Apr 13	21:36:22	24809	-36756	P	a-	-0.9666	1.0798	0.0886	264.7	67.2	-
23	-18	-0954	Apr 25	04:46:39	24489	-36533	P	a-	-0.8917	1.2147	0.2286	275.4	105.5	-
24	-17	-0936	May 05	11:55:35	24172	-36310	P	a-	-0.8146	1.3539	0.3724	284.9	131.5	-
25	-16	-0918	May 16	19:03:53	23856	-36087	P	a-	-0.7360	1.4960	0.5185	293.3	151.2	-
26	-15	-0900	May 27	02:12:10	23542	-35864	P	a-	-0.6564	1.6404	0.6662	300.5	166.9	-
27	-14	-0882	Jun 07	09:22:52	23231	-35641	P	a-	-0.5779	1.7832	0.8117	306.6	179.3	-
28	-13	-0864	Jun 17	16:36:15	22922	-35418	P	a-	-0.5010	1.9232	0.9539	311.5	189.0	-
29	-12	-0846	Jun 28	23:55:04	22614	-35195	T	a-	-0.4276	2.0571	1.0892	315.3	196.5	44.4
30	-11	-0828	Jul 09	07:18:01	22309	-34972	T	a-	-0.3572	2.1859	1.2190	318.2	202.2	66.6

31	-10	-0810	Jul 20	14:49:19	22006	-34749	T	p-	-0.2931	2.3032	1.3366	320.3	206.2	79.2
32	-09	-0792	Jul 30	22:26:57	21705	-34526	T-	p-	-0.2339	2.4119	1.4452	321.6	209.0	87.3
33	-08	-0774	Aug 11	06:14:12	21406	-34303	T-	p-	-0.1822	2.5072	1.5399	322.4	210.7	92.3
34	-07	-0756	Aug 21	14:08:42	21109	-34080	T-	p-	-0.1359	2.5925	1.6244	322.7	211.7	95.5
35	-06	-0738	Sep 01	22:13:51	20814	-33857	T-	p-	-0.0980	2.6627	1.6935	322.8	212.2	97.3
36	-05	-0720	Sep 12	06:26:53	20521	-33634	T-	p-	-0.0664	2.7212	1.7508	322.6	212.3	98.2
37	-04	-0702	Sep 23	14:49:03	20231	-33411	T-	p-	-0.0420	2.7666	1.7951	322.4	212.2	98.5
38	-03	-0684	Oct 03	23:18:52	19942	-33188	T-	pp	-0.0235	2.8010	1.8283	322.1	211.9	98.6
39	-02	-0666	Oct 15	07:57:00	19655	-32965	T-	pp	-0.0115	2.8236	1.8500	321.7	211.6	98.5
40	-01	-0648	Oct 25	16:40:37	19371	-32742	T-	pp	-0.0039	2.8378	1.8636	321.4	211.4	98.4
41	00	-0630	Nov 06	01:29:13	19088	-32519	T-	pp	-0.0002	2.8448	1.8703	321.1	211.1	98.3
42	01	-0612	Nov 16	10:20:37	18808	-32296	T+	pp	0.0014	2.8425	1.8681	320.7	210.9	98.2
43	02	-0594	Nov 27	19:14:40	18530	-32073	T+	pp	0.0011	2.8428	1.8690	320.4	210.8	98.1
44	03	-0576	Dec 08	04:07:19	18253	-31850	T+	pp	0.0020	2.8405	1.8677	320.1	210.6	98.1
45	04	-0558	Dec 19	12:59:22	17979	-31627	T+	pp	0.0037	2.8367	1.8654	319.8	210.6	98.1
46	05	-0540	Dec 29	21:47:00	17707	-31404	T+	pp	0.0093	2.8255	1.8561	319.5	210.6	98.1
47	06	-0521	Jan 10	06:31:20	17437	-31181	T+	pp	0.0175	2.8092	1.8420	319.2	210.6	98.2
48	07	-0503	Jan 20	15:07:50	17169	-30958	T+	pp	0.0327	2.7802	1.8155	318.9	210.5	98.1
49	08	-0485	Jan 31	23:39:21	16857	-30735	T+	pp	0.0520	2.7434	1.7813	318.6	210.5	97.9
50	09	-0467	Feb 11	08:02:00	16545	-30512	T+	-p	0.0791	2.6923	1.7329	318.1	210.2	97.2
51	10	-0449	Feb 22	16:17:28	16241	-30289	T+	-p	0.1122	2.6302	1.6735	317.6	209.8	96.0
52	11	-0431	Mar 05	00:23:38	15946	-30066	T+	-p	0.1532	2.5538	1.5995	316.8	208.9	93.7
53	12	-0413	Mar 16	08:23:00	15659	-29843	T+	-p	0.1998	2.4672	1.5152	315.7	207.4	90.1
54	13	-0395	Mar 26	16:14:14	15379	-29620	T+	-p	0.2533	2.3680	1.4178	314.2	205.1	84.4
55	14	-0377	Apr 06	23:57:38	15105	-29397	T	-p	0.3132	2.2574	1.3087	312.1	201.9	75.5
56	15	-0359	Apr 17	07:34:51	14839	-29174	T	-a	0.3780	2.1380	1.1902	309.3	197.3	61.7
57	16	-0341	Apr 28	15:06:33	14578	-28951	T	-a	0.4470	2.0111	1.0637	305.7	191.4	37.2
58	17	-0323	May 08	22:33:43	14324	-28728	P	-a	0.5195	1.8783	0.9306	301.3	183.6	-

59	18	-0305	May 20	05:56:59	14075	-28505	P	-a	0.5948	1.7405	0.7919	295.8	173.8	-
60	19	-0287	May 30	13:18:35	13832	-28282	P	-a	0.6710	1.6016	0.6515	289.4	161.6	-
61	20	-0269	Jun 10	20:39:26	13594	-28059	P	-a	0.7469	1.4634	0.5110	282.0	146.6	-
62	21	-0251	Jun 21	03:59:44	13361	-27836	P	-a	0.8227	1.3258	0.3705	273.6	127.8	-
63	22	-0233	Jul 02	11:22:06	13132	-27613	P	-a	0.8961	1.1928	0.2340	264.3	103.8	-
64	23	-0215	Jul 12	18:47:07	12909	-27390	P	-a	0.9665	1.0657	0.1028	254.2	70.2	-
65	24	-0197	Jul 24	02:16:48	12689	-27167	N	-a	1.0324	0.9471	-0.0204	243.5	-	-
66	25	-0179	Aug 03	09:50:23	12474	-26944	N	-a	1.0944	0.8361	-0.1366	232.4	-	-
67	26	-0161	Aug 14	17:31:05	12263	-26721	N	-a	1.1495	0.7376	-0.2405	221.3	-	-
68	27	-0143	Aug 25	01:17:57	12056	-26498	N	-a	1.1990	0.6497	-0.3342	210.4	-	-
69	28	-0125	Sep 05	09:12:19	11852	-26275	N	-a	1.2417	0.5742	-0.4155	200.1	-	-
70	29	-0107	Sep 15	17:13:18	11652	-26052	N	-a	1.2784	0.5101	-0.4856	190.5	-	-
71	30	-0089	Sep 27	01:22:14	11455	-25829	N	-a	1.3079	0.4589	-0.5427	182.4	-	-
72	31	-0071	Oct 07	09:37:53	11262	-25606	N	-a	1.3311	0.4193	-0.5881	175.7	-	-
73	32	-0053	Oct 18	17:58:59	11071	-25383	N	-a	1.3493	0.3886	-0.6242	170.3	-	-
74	33	-0035	Oct 29	02:26:14	10883	-25160	N	-a	1.3618	0.3681	-0.6498	166.7	-	-
75	34	-0017	Nov 09	10:57:12	10698	-24937	N	-a	1.3711	0.3534	-0.6690	164.2	-	-
76	35	0001	Nov 19	19:31:30	10515	-24714	N	-a	1.3768	0.3449	-0.6815	163.0	-	-
77	36	0019	Dec 01	04:05:20	10334	-24491	N	-a	1.3824	0.3363	-0.6935	161.7	-	-
78	37	0037	Dec 11	12:39:56	10156	-24268	N	-a	1.3868	0.3298	-0.7029	160.8	-	-
79	38	0055	Dec 22	21:11:25	9979	-24045	N	-a	1.3935	0.3186	-0.7163	158.7	-	-
80	39	0074	Jan 02	05:39:16	9803	-23822	N	-a	1.4024	0.3032	-0.7334	155.6	-	-
81	40	0092	Jan 13	14:00:41	9629	-23599	N	-a	1.4160	0.2787	-0.7591	150.0	-	-
82	41	0110	Jan 23	22:15:49	9456	-23376	N	-a	1.4340	0.2460	-0.7925	141.8	-	-
83	42	0128	Feb 04	06:22:08	9284	-23153	N	-a	1.4585	0.2013	-0.8376	129.2	-	-
84	43	0146	Feb 14	14:19:19	9112	-22930	N	-a	1.4897	0.1442	-0.8948	110.3	-	-
85	44	0164	Feb 25	22:06:19	8941	-22707	N	-h	1.5282	0.0736	-0.9655	79.5	-	-

SAROS SERIES

46

Saros series 46 contains 76 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-41	-1358 Jul 19 11:06:21	32146 -41527	Nb	a-	1.5374	0.0127	-0.9395	30.3	-	-	-	-	-
02	-40	-1340 Jul 29 18:52:09	31782 -41304	N	a-	1.4822	0.1149	-0.8387	90.0	-	-	-	-	-
03	-39	-1322 Aug 10 02:45:24	31420 -41081	N	a-	1.4326	0.2066	-0.7486	119.7	-	-	-	-	-
04	-38	-1304 Aug 20 10:47:39	31060 -40858	N	a-	1.3900	0.2858	-0.6715	139.6	-	-	-	-	-
05	-37	-1286 Aug 31 18:58:19	30702 -40635	N	a-	1.3538	0.3533	-0.6062	154.2	-	-	-	-	-
06	-36	-1268 Sep 11 03:17:21	30346 -40412	N	a-	1.3245	0.4083	-0.5536	164.9	-	-	-	-	-
07	-35	-1250 Sep 22 11:44:45	29993 -40189	N	a-	1.3018	0.4511	-0.5131	172.6	-	-	-	-	-
08	-34	-1232 Oct 02 20:20:10	29641 -39966	N	a-	1.2859	0.4814	-0.4849	177.8	-	-	-	-	-
09	-33	-1214 Oct 14 05:02:08	29291 -39743	N	a-	1.2751	0.5022	-0.4661	181.2	-	-	-	-	-
10	-32	-1196 Oct 24 13:48:42	28944 -39520	N	a-	1.2682	0.5157	-0.4543	183.5	-	-	-	-	-

11	-31	-1178	Nov 04	22:39:51	28599	-39297	N	a-	1.2653	0.5218	-0.4495	184.5	-	-
12	-30	-1160	Nov 15	07:33:33	28255	-39074	N	a-	1.2650	0.5227	-0.4494	184.7	-	-
13	-29	-1142	Nov 26	16:27:42	27914	-38851	N	a-	1.2652	0.5225	-0.4500	184.8	-	-
14	-28	-1124	Dec 07	01:20:43	27575	-38628	N	a-	1.2651	0.5226	-0.4499	184.9	-	-
15	-27	-1106	Dec 18	10:11:04	27238	-38405	N	a-	1.2633	0.5257	-0.4462	185.5	-	-
16	-26	-1088	Dec 28	18:57:52	26903	-38182	N	a-	1.2591	0.5331	-0.4380	186.8	-	-
17	-25	-1069	Jan 09	03:38:01	26570	-37959	N	a-	1.2502	0.5488	-0.4211	189.4	-	-
18	-24	-1051	Jan 19	12:12:29	26239	-37736	N	a-	1.2372	0.5719	-0.3966	193.1	-	-
19	-23	-1033	Jan 30	20:38:31	25910	-37513	N	a-	1.2179	0.6066	-0.3604	198.3	-	-
20	-22	-1015	Feb 10	04:57:06	25583	-37290	N	a-	1.1931	0.6513	-0.3141	204.8	-	-
21	-21	-0997	Feb 21	13:05:53	25258	-37067	N	a-	1.1607	0.7100	-0.2539	212.9	-	-
22	-20	-0979	Mar 03	21:07:10	24936	-36844	N	a-	1.1227	0.7790	-0.1837	221.8	-	-
23	-19	-0961	Mar 15	04:59:15	24615	-36621	N	a-	1.0778	0.8609	-0.1008	231.6	-	-
24	-18	-0943	Mar 25	12:42:49	24297	-36398	N	a-	1.0264	0.9549	-0.0062	242.0	-	-
25	-17	-0925	Apr 05	20:18:45	23980	-36175	P	a-	0.9692	1.0599	0.0989	252.7	68.7	-
26	-16	-0907	Apr 16	03:48:01	23666	-35952	P	a-	0.9069	1.1743	0.2129	263.3	99.5	-
27	-15	-0889	Apr 27	11:11:42	23354	-35729	P	a-	0.8407	1.2963	0.3340	273.7	122.7	-
28	-14	-0871	May 07	18:29:33	23043	-35506	P	a-	0.7704	1.4261	0.4623	283.6	142.0	-
29	-13	-0853	May 19	01:44:41	22735	-35283	P	a-	0.6983	1.5594	0.5934	292.9	158.1	-
30	-12	-0835	May 29	08:57:01	22429	-35060	P	a-	0.6244	1.6965	0.7275	301.5	171.8	-
31	-11	-0817	Jun 09	16:08:08	22125	-34837	P	a-	0.5503	1.8342	0.8618	309.2	183.3	-
32	-10	-0799	Jun 19	23:19:23	21823	-34614	P	a-	0.4770	1.9708	0.9943	316.1	192.9	-
33	-09	-0781	Jul 01	06:32:38	21524	-34391	T	p-	0.4061	2.1033	1.1221	322.1	200.6	52.0
34	-08	-0763	Jul 11	13:49:12	21226	-34168	T	p-	0.3386	2.2298	1.2434	327.3	206.8	70.8
35	-07	-0745	Jul 22	21:08:50	20930	-33945	T	p-	0.2743	2.3507	1.3586	331.8	211.7	82.6
36	-06	-0727	Aug 02	04:34:53	20637	-33722	T+	pp	0.2160	2.4606	1.4625	335.5	215.4	90.4
37	-05	-0709	Aug 13	12:06:15	20345	-33499	T+	pp	0.1629	2.5613	1.5568	338.7	218.1	95.5
38	-04	-0691	Aug 23	19:45:24	20056	-33276	T+	pp	0.1170	2.6488	1.6379	341.4	220.0	98.7

39	-03	-0673	Sep 04	03:30:04	19768	-33053	T+	pp	0.0765	2.7265	1.7090	343.7	221.4	100.6
40	-02	-0655	Sep 14	11:23:51	19483	-32830	T+	pp	0.0442	2.7890	1.7650	345.8	222.3	101.5
41	-01	-0637	Sep 25	19:23:25	19200	-32607	T+	pp	0.0174	2.8414	1.8110	347.7	223.0	101.9
42	00	-0619	Oct 06	03:30:41	18918	-32384	T-	pp	-0.0020	2.8727	1.8363	349.4	223.5	102.1
43	01	-0601	Oct 17	11:43:05	18639	-32161	T-	pp	-0.0164	2.8490	1.8070	351.1	224.0	102.0
44	02	-0583	Oct 27	20:01:50	18362	-31938	T-	pp	-0.0245	2.8367	1.7896	352.7	224.5	102.0
45	03	-0565	Nov 08	04:22:55	18087	-31715	T-	pp	-0.0301	2.8287	1.7770	354.2	225.0	102.0
46	04	-0547	Nov 18	12:46:21	17814	-31492	T-	pp	-0.0330	2.8254	1.7698	355.7	225.5	102.1
47	05	-0529	Nov 29	21:09:48	17544	-31269	T-	pp	-0.0351	2.8233	1.7645	357.0	226.1	102.2
48	06	-0511	Dec 10	05:32:55	17275	-31046	T-	pp	-0.0362	2.8225	1.7612	358.3	226.6	102.4
49	07	-0493	Dec 21	13:51:29	16983	-30823	T-	pp	-0.0406	2.8154	1.7522	359.5	227.1	102.5
50	08	-0475	Dec 31	22:06:02	16667	-30600	T-	pp	-0.0475	2.8033	1.7388	360.6	227.7	102.5
51	09	-0456	Jan 12	06:13:11	16360	-30377	T-	pp	-0.0598	2.7810	1.7159	361.5	228.1	102.4
52	10	-0438	Jan 22	14:13:58	16062	-30154	T-	pp	-0.0767	2.7500	1.6848	362.4	228.5	102.1
53	11	-0420	Feb 02	22:03:43	15771	-29931	T-	pp	-0.1017	2.7041	1.6392	363.0	228.6	101.2
54	12	-0402	Feb 13	05:45:30	15488	-29708	T-	pp	-0.1325	2.6474	1.5829	363.4	228.3	99.6
55	13	-0384	Feb 24	13:15:13	15212	-29485	T-	pp	-0.1724	2.5737	1.5099	363.3	227.5	96.6
56	14	-0366	Mar 06	20:36:11	14943	-29262	T-	-p	-0.2188	2.4881	1.4252	362.8	225.9	91.6
57	15	-0348	Mar 17	03:44:43	14680	-29039	T	-p	-0.2746	2.3855	1.3233	361.5	223.2	83.4
58	16	-0330	Mar 28	10:45:05	14424	-28816	T	-t	-0.3363	2.2720	1.2104	359.4	219.1	70.2
59	17	-0312	Apr 07	17:34:51	14173	-28593	T	-t	-0.4057	2.1444	1.0833	356.3	213.1	46.2
60	18	-0294	Apr 19	00:16:45	13927	-28370	P	-t	-0.4807	2.0065	0.9456	351.8	204.8	-
61	19	-0276	Apr 29	06:51:03	13687	-28147	P	-t	-0.5612	1.8589	0.7978	345.9	193.5	-
62	20	-0258	May 10	13:20:17	13452	-27924	P	-t	-0.6452	1.7050	0.6435	338.4	178.8	-
63	21	-0240	May 20	19:45:32	13222	-27701	P	-t	-0.7317	1.5469	0.4845	329.1	159.4	-
64	22	-0222	Jun 01	02:07:33	12996	-27478	P	-t	-0.8199	1.3856	0.3219	317.9	133.4	-
65	23	-0204	Jun 11	08:29:19	12775	-27255	P	-t	-0.9078	1.2252	0.1598	304.9	96.4	-
66	24	-0186	Jun 22	14:51:38	12558	-27032	Nx	-t	-0.9948	1.0666	-0.0008	289.9	-	-

67	25	-0168	Jul 02	21:16:27	12346	-26809	N	-t	-1.0790	0.9132	-0.1566	273.0	-	-
68	26	-0150	Jul 14	03:45:01	12137	-26586	N	-t	-1.1597	0.7666	-0.3059	254.2	-	-
69	27	-0132	Jul 24	10:19:56	11932	-26363	N	-t	-1.2348	0.6303	-0.4452	233.9	-	-
70	28	-0114	Aug 04	17:01:44	11731	-26140	N	-t	-1.3040	0.5048	-0.5739	212.1	-	-
71	29	-0096	Aug 14	23:50:54	11532	-25917	N	-t	-1.3671	0.3908	-0.6912	188.8	-	-
72	30	-0078	Aug 26	06:49:10	11338	-25694	N	-t	-1.4225	0.2907	-0.7945	164.4	-	-
73	31	-0060	Sep 05	13:56:45	11146	-25471	N	-t	-1.4701	0.2050	-0.8835	139.2	-	-
74	32	-0042	Sep 16	21:14:06	10957	-25248	N	-t	-1.5100	0.1333	-0.9582	113.0	-	-
75	33	-0024	Sep 27	04:40:15	10771	-25025	N	-t	-1.5428	0.0746	-1.0197	85.0	-	-
76	34	-0006	Oct 08	12:16:05	10587	-24802	N	-t	-1.5681	0.0294	-1.0672	53.6	-	-

SAROS SERIES

47

Saros series 47 contains 86 lunar eclipses.

											PHASE		
											DURATIONS		
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													

01	-35	-1275	Jul 31	21:55:22	30487	-40500	Nb	t-	-1.5592	0.0102	-1.0160	29.5	-	-
02	-34	-1257	Aug 12	05:16:34	30132	-40277	N	t-	-1.5136	0.0972	-0.9356	91.0	-	-
03	-33	-1239	Aug 22	12:44:33	29780	-40054	N	t-	-1.4739	0.1733	-0.8662	121.3	-	-
04	-32	-1221	Sep 02	20:20:31	29429	-39831	N	t-	-1.4414	0.2364	-0.8099	141.5	-	-
05	-31	-1203	Sep 13	04:04:06	29081	-39608	N	t-	-1.4155	0.2871	-0.7656	155.9	-	-
06	-30	-1185	Sep 24	11:55:25	28735	-39385	N	t-	-1.3963	0.3256	-0.7333	166.1	-	-
07	-29	-1167	Oct 04	19:52:51	28390	-39162	N	t-	-1.3827	0.3535	-0.7112	173.4	-	-
08	-28	-1149	Oct 16	03:56:53	28048	-38939	N	t-	-1.3749	0.3703	-0.6996	177.9	-	-
09	-27	-1131	Oct 26	12:05:06	27708	-38716	N	t-	-1.3712	0.3795	-0.6951	180.6	-	-
10	-26	-1113	Nov 06	20:16:23	27370	-38493	N	t-	-1.3706	0.3827	-0.6958	181.9	-	-
11	-25	-1095	Nov 17	04:29:23	27034	-38270	N	t-	-1.3717	0.3821	-0.6995	182.4	-	-
12	-24	-1077	Nov 28	12:42:38	26701	-38047	N	t-	-1.3734	0.3803	-0.7038	182.5	-	-
13	-23	-1059	Dec 08	20:53:19	26369	-37824	N	t-	-1.3737	0.3806	-0.7051	183.0	-	-
14	-22	-1041	Dec 20	05:00:07	26039	-37601	N	t-	-1.3713	0.3855	-0.7012	184.6	-	-
15	-21	-1023	Dec 30	13:01:34	25712	-37378	N	t-	-1.3650	0.3971	-0.6897	187.5	-	-
16	-20	-1004	Jan 10	20:56:40	25386	-37155	N	t-	-1.3537	0.4176	-0.6688	192.3	-	-
17	-19	-0986	Jan 21	04:42:12	25063	-36932	N	t-	-1.3352	0.4511	-0.6343	199.5	-	-
18	-18	-0968	Feb 01	12:19:20	24741	-36709	N	t-	-1.3102	0.4962	-0.5879	208.7	-	-
19	-17	-0950	Feb 11	19:45:36	24422	-36486	N	t-	-1.2768	0.5566	-0.5258	220.0	-	-
20	-16	-0932	Feb 23	03:03:02	24105	-36263	N	t-	-1.2365	0.6297	-0.4508	232.7	-	-
21	-15	-0914	Mar 05	10:08:06	23790	-36040	N	t-	-1.1864	0.7206	-0.3578	246.9	-	-
22	-14	-0896	Mar 15	17:05:03	23477	-35817	N	t-	-1.1297	0.8236	-0.2528	261.5	-	-
23	-13	-0878	Mar 26	23:50:59	23166	-35594	N	t-	-1.0645	0.9423	-0.1323	276.5	-	-
24	-12	-0860	Apr 06	06:29:46	22857	-35371	Nx	t-	-0.9934	1.0718	-0.0010	291.0	-	-
25	-11	-0842	Apr 17	12:59:55	22550	-35148	P	t-	-0.9152	1.2145	0.1432	305.2	91.7	-
26	-10	-0824	Apr 27	19:25:44	22245	-34925	P	t-	-0.8335	1.3638	0.2938	318.1	128.6	-
27	-09	-0806	May 09	01:46:42	21942	-34702	P	t-	-0.7477	1.5209	0.4518	329.9	155.7	-

28 -08 -0788 May 19 08:04:41 21642 -34479 P t- -0.6591 1.6832 0.6145 340.4 176.9 -

29 -07 -0770 May 30 14:21:44 21343 -34256 P t- -0.5696 1.8473 0.7788 349.4 193.7 -

30 -06 -0752 Jun 09 20:39:50 21047 -34033 P t- -0.4808 2.0104 0.9416 356.8 206.8 -

31 -05 -0734 Jun 21 03:00:35 20752 -33810 T t- -0.3935 2.1709 1.1016 362.7 216.8 51.3

32 -04 -0716 Jul 01 09:25:03 20460 -33587 T t- -0.3089 2.3266 1.2563 367.1 224.2 77.2

33 -03 -0698 Jul 12 15:55:53 20170 -33364 T- pp -0.2291 2.4737 1.4021 370.2 229.3 91.4

34 -02 -0680 Jul 22 22:34:06 19881 -33141 T- pp -0.1552 2.6101 1.5370 372.2 232.5 99.6

35 -01 -0662 Aug 03 05:19:48 19595 -32918 T- pp -0.0869 2.7361 1.6614 373.2 234.2 104.0

36 00 -0644 Aug 13 12:15:01 19311 -32695 T- pp -0.0260 2.8489 1.7722 373.4 234.6 105.6

37 01 -0626 Aug 24 19:20:01 19029 -32472 T+ pp 0.0274 2.8473 1.7689 373.1 234.2 105.3

38 02 -0608 Sep 04 02:36:09 18749 -32249 T+ pp 0.0718 2.7667 1.6864 372.4 233.2 103.9

39 03 -0590 Sep 15 10:00:53 18471 -32026 T+ pp 0.1096 2.6980 1.6162 371.4 232.0 101.7

40 04 -0572 Sep 25 17:37:16 18196 -31803 T+ pp 0.1383 2.6461 1.5629 370.3 230.6 99.5

41 05 -0554 Oct 07 01:22:13 17922 -31580 T+ pp 0.1606 2.6058 1.5217 369.2 229.4 97.4

42 06 -0536 Oct 17 09:16:58 17650 -31357 T+ pp 0.1754 2.5788 1.4943 368.1 228.3 95.8

43 07 -0518 Oct 28 17:17:19 17381 -31134 T+ pp 0.1860 2.5591 1.4748 367.1 227.4 94.5

44 08 -0500 Nov 08 01:25:12 17110 -30911 T+ pp 0.1913 2.5490 1.4656 366.0 226.6 93.8

45 09 -0482 Nov 19 09:36:17 16791 -30688 T+ pp 0.1946 2.5422 1.4603 364.9 226.0 93.3

46 10 -0464 Nov 29 17:50:24 16480 -30465 T+ pp 0.1963 2.5380 1.4584 363.7 225.5 93.0

47 11 -0446 Dec 11 02:04:39 16179 -30242 T+ pp 0.1986 2.5322 1.4556 362.4 224.9 92.7

48 12 -0428 Dec 21 10:18:49 15885 -30019 T+ pp 0.2020 2.5239 1.4512 360.9 224.3 92.3

49 13 -0409 Jan 01 18:29:02 15599 -29796 T+ pp 0.2093 2.5084 1.4402 359.3 223.5 91.4

50 14 -0391 Jan 12 02:35:16 15321 -29573 T+ pp 0.2207 2.4848 1.4218 357.3 222.5 90.0

51 15 -0373 Jan 23 10:35:49 15049 -29350 T+ pp 0.2376 2.4509 1.3935 355.1 221.1 87.8

52 16 -0355 Feb 02 18:30:51 14783 -29127 T+ -p 0.2602 2.4065 1.3551 352.6 219.4 84.6

53 17 -0337 Feb 14 02:17:04 14524 -28904 T -p 0.2907 2.3472 1.3023 349.6 216.9 79.5

54 18 -0319 Feb 24 09:57:04 14271 -28681 T -p 0.3270 2.2773 1.2389 346.2 213.8 72.1

55 19 -0301 Mar 07 17:28:37 14024 -28458 T -p 0.3711 2.1930 1.1612 342.1 209.7 60.7

56	20	-0283	Mar 18	00:54:28	13781	-28235	T	-t	0.4208	2.0985	1.0732	337.3	204.5	42.0
57	21	-0265	Mar 29	08:11:43	13544	-28012	P	-t	0.4786	1.9893	0.9705	331.6	197.6	-
58	22	-0247	Apr 08	15:25:25	13312	-27789	P	-t	0.5402	1.8732	0.8605	325.1	189.2	-
59	23	-0229	Apr 19	22:32:56	13085	-27566	P	-t	0.6075	1.7468	0.7398	317.5	178.6	-
60	24	-0211	Apr 30	05:38:18	12862	-27343	P	-t	0.6775	1.6156	0.6140	308.8	165.5	-
61	25	-0193	May 11	12:40:18	12643	-27120	P	-t	0.7513	1.4778	0.4810	298.9	149.1	-
62	26	-0175	May 21	19:43:03	12429	-26897	P	-t	0.8252	1.3400	0.3476	287.9	128.9	-
63	27	-0157	Jun 02	02:45:49	12219	-26674	P	-h	0.8998	1.2012	0.2124	275.6	102.4	-
64	28	-0139	Jun 12	09:50:18	12012	-26451	P	-h	0.9739	1.0636	0.0780	262.2	63.0	-
65	29	-0121	Jun 23	16:58:25	11810	-26228	N	-h	1.0455	0.9309	-0.0522	247.8	-	-
66	30	-0103	Jul 04	00:11:02	11610	-26005	N	-a	1.1140	0.8043	-0.1769	232.5	-	-
67	31	-0085	Jul 15	07:29:49	11414	-25782	N	-a	1.1783	0.6857	-0.2941	216.5	-	-
68	32	-0067	Jul 25	14:54:32	11221	-25559	N	-a	1.2382	0.5753	-0.4036	199.8	-	-
69	33	-0049	Aug 05	22:28:04	11031	-25336	N	-a	1.2916	0.4771	-0.5013	183.2	-	-
70	34	-0031	Aug 16	06:09:23	10844	-25113	N	-a	1.3391	0.3899	-0.5885	166.5	-	-
71	35	-0013	Aug 27	13:59:32	10659	-24890	N	-a	1.3801	0.3147	-0.6639	150.2	-	-
72	36	0005	Sep 06	21:58:22	10477	-24667	N	-a	1.4149	0.2513	-0.7279	134.7	-	-
73	37	0023	Sep 18	06:07:14	10297	-24444	N	-a	1.4424	0.2011	-0.7787	120.8	-	-
74	38	0041	Sep 28	14:24:35	10118	-24221	N	-a	1.4635	0.1626	-0.8178	108.8	-	-
75	39	0059	Oct 09	22:50:07	9942	-23998	N	-a	1.4790	0.1346	-0.8464	99.0	-	-
76	40	0077	Oct 20	07:23:24	9766	-23775	N	-a	1.4889	0.1164	-0.8649	92.0	-	-
77	41	0095	Oct 31	16:04:01	9592	-23552	N	-a	1.4941	0.1070	-0.8744	88.2	-	-
78	42	0113	Nov 11	00:49:12	9420	-23329	N	-a	1.4962	0.1030	-0.8781	86.3	-	-
79	43	0131	Nov 22	09:38:19	9247	-23106	N	-a	1.4959	0.1033	-0.8772	86.3	-	-
80	44	0149	Dec 02	18:29:12	9076	-22883	N	-a	1.4948	0.1046	-0.8747	86.7	-	-
81	45	0167	Dec 14	03:21:33	8905	-22660	N	-a	1.4933	0.1067	-0.8711	87.4	-	-
82	46	0185	Dec 24	12:11:07	8734	-22437	N	-a	1.4945	0.1033	-0.8724	85.9	-	-
83	47	0204	Jan 04	20:59:22	8563	-22214	N	-a	1.4974	0.0968	-0.8765	83.1	-	-

84	48	0222	Jan 15	05:42:03	8392 -21991	N	-a	1.5053	0.0810	-0.8894	76.0	-	-
85	49	0240	Jan 26	14:20:22	8220 -21768	N	-a	1.5168	0.0582	-0.9092	64.4	-	-
86	50	0258	Feb 05	22:50:15	8048 -21545	Ne	-a	1.5356	0.0220	-0.9420	39.7	-	-

SAROS SERIES

48

Saros series 48 contains 75 lunar eclipses.

													PHASE
													DURATIONS
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-35	-1228 Jul 21	11:53:49	29567 -39919	N	t-	1.5223	0.0946	-0.9647	93.3	-	-	
02	-34	-1210 Aug 01	18:50:11	29218 -39696	N	t-	1.4570	0.2148	-0.8452	138.7	-	-	
03	-33	-1192 Aug 12	01:58:12	28871 -39473	N	t-	1.3996	0.3203	-0.7403	167.3	-	-	
04	-32	-1174 Aug 23	09:15:59	28526 -39250	N	t-	1.3489	0.4137	-0.6476	188.1	-	-	
05	-31	-1156 Sep 02	16:44:22	28183 -39027	N	t-	1.3056	0.4934	-0.5685	203.3	-	-	
06	-30	-1138 Sep 14	00:23:31	27842 -38804	N	h-	1.2701	0.5589	-0.5036	214.5	-	-	

07	-29	-1120	Sep 24	08:13:09	27503	-38581	N	h-	1.2424	0.6098	-0.4529	222.4	-	-
08	-28	-1102	Oct 05	16:12:20	27167	-38358	N	h-	1.2212	0.6486	-0.4139	227.8	-	-
09	-27	-1084	Oct 16	00:18:41	26832	-38135	N	a-	1.2051	0.6780	-0.3840	231.6	-	-
10	-26	-1066	Oct 27	08:33:07	26500	-37912	N	a-	1.1946	0.6967	-0.3642	233.6	-	-
11	-25	-1048	Nov 06	16:52:30	26169	-37689	N	a-	1.1874	0.7089	-0.3502	234.6	-	-
12	-24	-1030	Nov 18	01:15:57	25841	-37466	N	a-	1.1827	0.7163	-0.3404	234.8	-	-
13	-23	-1012	Nov 28	09:40:43	25514	-37243	N	a-	1.1785	0.7225	-0.3310	234.8	-	-
14	-22	-0994	Dec 09	18:06:28	25190	-37020	N	a-	1.1741	0.7287	-0.3211	234.8	-	-
15	-21	-0976	Dec 20	02:30:03	24868	-36797	N	a-	1.1672	0.7391	-0.3063	235.2	-	-
16	-20	-0958	Dec 31	10:50:16	24548	-36574	N	a-	1.1568	0.7556	-0.2847	236.5	-	-
17	-19	-0939	Jan 10	19:05:57	24230	-36351	N	a-	1.1420	0.7799	-0.2548	238.6	-	-
18	-18	-0921	Jan 22	03:16:17	23914	-36128	N	a-	1.1225	0.8128	-0.2160	241.7	-	-
19	-17	-0903	Feb 01	11:18:55	23600	-35905	N	a-	1.0957	0.8587	-0.1637	246.1	-	-
20	-16	-0885	Feb 12	19:14:49	23288	-35682	N	a-	1.0626	0.9162	-0.0998	251.6	-	-
21	-15	-0867	Feb 23	03:02:59	22978	-35459	N	a-	1.0225	0.9865	-0.0229	257.9	-	-
22	-14	-0849	Mar 06	10:44:51	22671	-35236	P	a-	0.9764	1.0677	0.0648	264.7	57.8	-
23	-13	-0831	Mar 16	18:17:58	22365	-35013	P	a-	0.9223	1.1638	0.1673	272.2	91.2	-
24	-12	-0813	Mar 28	01:46:36	22062	-34790	P	a-	0.8636	1.2684	0.2779	279.6	115.3	-
25	-11	-0795	Apr 07	09:08:25	21760	-34567	P	a-	0.7981	1.3858	0.4010	287.0	135.6	-
26	-10	-0777	Apr 18	16:27:38	21461	-34344	P	a-	0.7297	1.5088	0.5292	293.8	152.3	-
27	-09	-0759	Apr 28	23:41:43	21163	-34121	P	a-	0.6559	1.6418	0.6669	300.3	166.8	-
28	-08	-0741	May 10	06:56:05	20868	-33898	P	a-	0.5813	1.7766	0.8059	305.9	178.6	-
29	-07	-0723	May 20	14:08:12	20575	-33675	P	a-	0.5036	1.9174	0.9501	310.8	188.6	-
30	-06	-0705	May 31	21:21:59	20284	-33452	T	a-	0.4264	2.0575	1.0932	314.7	196.5	45.3
31	-05	-0687	Jun 11	04:36:57	19995	-33229	T	a-	0.3493	2.1979	1.2358	317.9	202.8	68.8
32	-04	-0669	Jun 22	11:56:15	19708	-33006	T	p-	0.2749	2.3336	1.3731	320.1	207.3	82.3
33	-03	-0651	Jul 02	19:19:41	19423	-32783	T+	p-	0.2033	2.4646	1.5050	321.5	210.4	90.9
34	-02	-0633	Jul 14	02:48:38	19140	-32560	T+	p-	0.1356	2.5886	1.6295	322.3	212.3	96.1

35	-01	-0615	Jul 24	10:24:22	18859	-32337	T+	pp	0.0730	2.7035	1.7443	322.5	213.2	98.8
36	00	-0597	Aug 04	18:07:23	18581	-32114	T+	pp	0.0158	2.8088	1.8489	322.2	213.3	99.7
37	01	-0579	Aug 15	01:58:11	18304	-31891	T-	pp	-0.0351	2.7738	1.8129	321.7	212.7	99.2
38	02	-0561	Aug 26	09:57:21	18030	-31668	T-	pp	-0.0794	2.6932	1.7310	320.9	211.8	97.9
39	03	-0543	Sep 05	18:05:26	17757	-31445	T-	-p	-0.1167	2.6255	1.6618	320.1	210.7	96.0
40	04	-0525	Sep 17	02:22:22	17487	-31222	T-	-p	-0.1470	2.5709	1.6054	319.3	209.5	94.0
41	05	-0507	Sep 27	10:46:53	17218	-30999	T-	-p	-0.1713	2.5271	1.5600	318.5	208.4	92.0
42	06	-0489	Oct 08	19:20:03	16916	-30776	T-	-p	-0.1886	2.4960	1.5274	317.9	207.5	90.4
43	07	-0471	Oct 19	03:59:38	16602	-30553	T-	-p	-0.2008	2.4744	1.5045	317.4	206.8	89.1
44	08	-0453	Oct 30	12:45:41	16297	-30330	T-	-p	-0.2080	2.4617	1.4907	317.1	206.3	88.3
45	09	-0435	Nov 09	21:34:46	16000	-30107	T-	-p	-0.2130	2.4528	1.4811	316.8	205.9	87.7
46	10	-0417	Nov 21	06:28:03	15711	-29884	T-	-p	-0.2146	2.4501	1.4781	316.6	205.8	87.5
47	11	-0399	Dec 01	15:21:58	15430	-29661	T-	-p	-0.2157	2.4479	1.4761	316.5	205.7	87.3
48	12	-0381	Dec 13	00:15:56	15155	-29438	T-	-p	-0.2169	2.4455	1.4744	316.4	205.6	87.2
49	13	-0363	Dec 23	09:07:05	14887	-29215	T-	-p	-0.2203	2.4387	1.4686	316.2	205.5	86.9
50	14	-0344	Jan 03	17:55:10	14626	-28992	T-	-p	-0.2263	2.4269	1.4583	315.9	205.3	86.4
51	15	-0326	Jan 14	02:37:53	14370	-28769	T-	-p	-0.2367	2.4070	1.4401	315.5	204.9	85.3
52	16	-0308	Jan 25	11:14:05	14121	-28546	T-	-p	-0.2521	2.3776	1.4127	314.9	204.3	83.5
53	17	-0290	Feb 04	19:43:14	13876	-28323	T	-p	-0.2734	2.3375	1.3747	314.2	203.3	80.8
54	18	-0272	Feb 16	04:04:45	13637	-28100	T	-p	-0.3007	2.2863	1.3257	313.2	201.9	76.8
55	19	-0254	Feb 26	12:17:26	13403	-27877	T	-p	-0.3354	2.2216	1.2631	311.8	199.8	70.6
56	20	-0236	Mar 08	20:21:46	13174	-27654	T	-p	-0.3769	2.1444	1.1878	309.9	196.9	61.2
57	21	-0218	Mar 20	04:17:50	12949	-27431	T	-a	-0.4251	2.0552	1.1002	307.5	193.0	46.0
58	22	-0200	Mar 30	12:06:45	12729	-27208	T	-a	-0.4790	1.9556	1.0019	304.4	187.8	6.6
59	23	-0182	Apr 10	19:46:59	12513	-26985	P	-a	-0.5400	1.8434	0.8905	300.4	180.9	-
60	24	-0164	Apr 21	03:22:03	12301	-26762	P	-a	-0.6049	1.7240	0.7715	295.5	172.2	-
61	25	-0146	May 02	10:50:40	12093	-26539	P	-a	-0.6751	1.5953	0.6425	289.4	160.8	-
62	26	-0128	May 12	18:16:06	11889	-26316	P	-a	-0.7474	1.4632	0.5095	282.3	146.5	-

63	27	-0110	May 24	01:36:16	11688	-26093	P	-a	-0.8234	1.3244	0.3692	273.7	127.6	-
64	28	-0092	Jun 03	08:55:57	11491	-25870	P	-a	-0.8993	1.1864	0.2290	263.9	102.8	-
65	29	-0074	Jun 14	16:13:31	11297	-25647	P	-a	-0.9763	1.0465	0.0862	252.5	64.5	-
66	30	-0056	Jun 24	23:31:52	11106	-25424	N	-a	-1.0518	0.9096	-0.0541	239.6	-	-
67	31	-0038	Jul 06	06:51:17	10918	-25201	N	-a	-1.1257	0.7762	-0.1916	225.3	-	-
68	32	-0020	Jul 16	14:14:06	10732	-24978	N	-a	-1.1958	0.6497	-0.3226	209.5	-	-
69	33	-0002	Jul 27	21:41:06	10549	-24755	N	-a	-1.2618	0.5313	-0.4462	192.5	-	-
70	34	0016	Aug 07	05:12:17	10367	-24532	N	-a	-1.3235	0.4207	-0.5622	173.8	-	-
71	35	0034	Aug 18	12:50:05	10188	-24309	N	-a	-1.3791	0.3217	-0.6671	154.1	-	-
72	36	0052	Aug 28	20:33:55	10011	-24086	N	-a	-1.4292	0.2328	-0.7621	132.7	-	-
73	37	0070	Sep 09	04:25:28	9835	-23863	N	-a	-1.4723	0.1570	-0.8441	110.2	-	-
74	38	0088	Sep 19	12:23:25	9661	-23640	N	-a	-1.5096	0.0917	-0.9156	85.1	-	-
75	39	0106	Sep 30	20:29:48	9488	-23417	N	-a	-1.5395	0.0398	-0.9737	56.6	-	-

SAROS SERIES

49

Saros series 49 contains 73 lunar eclipses.

PHASE

DURATIONS

SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-38	-1217 Jun 21	08:08:20	29356 -39784	Nb	a-	-1.5092	0.0615	-0.8846	66.2	-	-	
02	-37	-1199 Jul 01	15:37:46	29008 -39561	N	a-	-1.4404	0.1879	-0.7586	114.2	-	-	
03	-36	-1181 Jul 12	23:13:29	28662 -39338	N	a-	-1.3764	0.3058	-0.6417	143.9	-	-	
04	-35	-1163 Jul 23	06:54:47	28318 -39115	N	a-	-1.3170	0.4155	-0.5334	166.0	-	-	
05	-34	-1145 Aug 03	14:44:08	27977 -38892	N	a-	-1.2640	0.5139	-0.4370	182.8	-	-	
06	-33	-1127 Aug 13	22:39:49	27637 -38669	N	a-	-1.2162	0.6027	-0.3505	196.2	-	-	
07	-32	-1109 Aug 25	06:44:53	27299 -38446	N	a-	-1.1763	0.6772	-0.2786	206.4	-	-	
08	-31	-1091 Sep 04	14:57:34	26964 -38223	N	a-	-1.1428	0.7402	-0.2185	214.5	-	-	
09	-30	-1073 Sep 15	23:18:50	26631 -38000	N	a-	-1.1164	0.7900	-0.1715	220.6	-	-	
10	-29	-1055 Sep 26	07:47:34	26299 -37777	N	a-	-1.0963	0.8283	-0.1361	225.2	-	-	
11	-28	-1037 Oct 07	16:23:52	25970 -37554	N	a-	-1.0824	0.8551	-0.1119	228.3	-	-	
12	-27	-1019 Oct 18	01:06:28	25643 -37331	N	a-	-1.0742	0.8715	-0.0980	230.3	-	-	
13	-26	-1001 Oct 29	09:53:14	25318 -37108	N	a-	-1.0694	0.8812	-0.0903	231.6	-	-	
14	-25	-0983 Nov 08	18:44:41	24995 -36885	N	a-	-1.0688	0.8833	-0.0899	232.0	-	-	
15	-24	-0965 Nov 20	03:37:47	24674 -36662	N	a-	-1.0693	0.8829	-0.0916	232.2	-	-	
16	-23	-0947 Nov 30	12:31:51	24355 -36439	N	a-	-1.0712	0.8798	-0.0955	232.2	-	-	
17	-22	-0929 Dec 11	21:23:23	24038 -36216	N	a-	-1.0713	0.8799	-0.0957	232.4	-	-	
18	-21	-0911 Dec 22	06:12:49	23724 -35993	N	a-	-1.0702	0.8819	-0.0936	232.9	-	-	
19	-20	-0892 Jan 02	14:57:15	23411 -35770	N	a-	-1.0652	0.8908	-0.0843	234.2	-	-	
20	-19	-0874 Jan 12	23:35:41	23100 -35547	N	a-	-1.0559	0.9075	-0.0669	236.3	-	-	
21	-18	-0856 Jan 24	08:06:42	22792 -35324	N	a-	-1.0410	0.9345	-0.0389	239.4	-	-	
22	-17	-0838 Feb 03	16:30:02	22485 -35101	N	a-	-1.0203	0.9718	-0.0005	243.6	-	-	
23	-16	-0820 Feb 15	00:44:20	22181 -34878	P	a-	-0.9929	1.0215	0.0503	248.8	49.1	-	
24	-15	-0802 Feb 25	08:49:33	21879 -34655	P	a-	-0.9585	1.0842	0.1140	255.1	73.5	-	

25	-14	-0784	Mar 07	16:45:43	21579	-34432	P	a-	-0.9172	1.1596	0.1902	262.2	94.1	-
26	-13	-0766	Mar 19	00:33:42	21280	-34209	P	a-	-0.8695	1.2467	0.2778	269.9	112.6	-
27	-12	-0748	Mar 29	08:12:08	20984	-33986	P	a-	-0.8147	1.3474	0.3786	278.1	129.9	-
28	-11	-0730	Apr 09	15:43:51	20690	-33763	P	a-	-0.7547	1.4576	0.4884	286.3	145.5	-
29	-10	-0712	Apr 19	23:08:01	20398	-33540	P	a-	-0.6893	1.5780	0.6079	294.6	159.8	-
30	-09	-0694	May 01	06:27:43	20109	-33317	P	a-	-0.6205	1.7050	0.7335	302.4	172.5	-
31	-08	-0676	May 11	13:40:13	19821	-33094	P	a-	-0.5465	1.8419	0.8683	310.0	184.0	-
32	-07	-0658	May 22	20:51:23	19535	-32871	T	a-	-0.4721	1.9797	1.0035	316.8	193.6	9.1
33	-06	-0640	Jun 02	03:58:32	19251	-32648	T	p-	-0.3953	2.1222	1.1427	323.0	201.9	55.9
34	-05	-0622	Jun 13	11:06:24	18970	-32425	T	p-	-0.3200	2.2624	1.2790	328.3	208.6	75.0
35	-04	-0604	Jun 23	18:12:41	18690	-32202	T-	pp	-0.2442	2.4038	1.4159	332.9	213.9	87.3
36	-03	-0586	Jul 05	01:22:56	18413	-31979	T-	pp	-0.1726	2.5376	1.5447	336.7	217.7	95.1
37	-02	-0568	Jul 15	08:34:55	18138	-31756	T-	pp	-0.1037	2.6669	1.6684	339.7	220.4	99.8
38	-01	-0550	Jul 26	15:51:20	17864	-31533	T-	pp	-0.0395	2.7876	1.7833	342.1	221.9	102.1
39	00	-0532	Aug 05	23:12:29	17593	-31310	T+	pp	0.0198	2.8270	1.8164	344.1	222.6	102.4
40	01	-0514	Aug 17	06:40:42	17324	-31087	T+	pp	0.0721	2.7342	1.7171	345.6	222.6	101.3
41	02	-0496	Aug 27	14:15:23	17042	-30864	T+	pp	0.1183	2.6529	1.6291	346.8	222.2	99.1
42	03	-0478	Sep 07	21:57:11	16724	-30641	T+	-p	0.1576	2.5841	1.5537	347.9	221.5	96.4
43	04	-0460	Sep 18	05:46:39	16416	-30418	T+	-p	0.1896	2.5288	1.4918	348.9	220.7	93.4
44	05	-0442	Sep 29	13:43:49	16116	-30195	T+	-p	0.2145	2.4862	1.4430	349.9	220.1	90.6
45	06	-0424	Oct 09	21:46:59	15824	-29972	T+	-p	0.2336	2.4541	1.4049	351.0	219.5	88.0
46	07	-0406	Oct 21	05:56:35	15540	-29749	T+	-p	0.2467	2.4328	1.3782	352.2	219.3	86.1
47	08	-0388	Oct 31	14:10:40	15263	-29526	T+	-p	0.2555	2.4192	1.3596	353.4	219.2	84.7
48	09	-0370	Nov 11	22:28:45	14992	-29303	T+	-p	0.2601	2.4129	1.3490	354.7	219.4	84.0
49	10	-0352	Nov 22	06:47:05	14728	-29080	T+	-p	0.2638	2.4079	1.3404	356.0	219.7	83.3
50	11	-0334	Dec 03	15:07:01	14471	-28857	T+	-p	0.2656	2.4062	1.3358	357.2	220.0	83.1
51	12	-0316	Dec 13	23:24:16	14218	-28634	T+	-p	0.2690	2.4009	1.3283	358.2	220.3	82.6
52	13	-0298	Dec 25	07:38:25	13972	-28411	T	-p	0.2743	2.3920	1.3181	359.1	220.5	81.8

53	14	-0279	Jan 04	15:46:02	13731	-28188	T	-p	0.2841	2.3743	1.2995	359.7	220.3	80.1
54	15	-0261	Jan 15	23:47:52	13495	-27965	T	-p	0.2982	2.3487	1.2737	360.0	219.9	77.5
55	16	-0243	Jan 26	07:41:14	13264	-27742	T	-p	0.3187	2.3109	1.2360	359.9	218.8	73.1
56	17	-0225	Feb 06	15:25:08	13037	-27519	T	-t	0.3464	2.2597	1.1856	359.2	217.1	66.1
57	18	-0207	Feb 16	22:59:13	12816	-27296	T	-t	0.3816	2.1946	1.1214	358.0	214.4	54.8
58	19	-0189	Feb 28	06:22:59	12598	-27073	T	-t	0.4246	2.1152	1.0432	356.0	210.4	33.6
59	20	-0171	Mar 10	13:36:30	12384	-26850	P	-t	0.4754	2.0213	0.9505	353.0	204.8	-
60	21	-0153	Mar 21	20:39:26	12175	-26627	P	-t	0.5344	1.9124	0.8429	348.9	197.1	-
61	22	-0135	Apr 01	03:33:22	11969	-26404	P	-t	0.6002	1.7911	0.7227	343.4	186.7	-
62	23	-0117	Apr 12	10:18:30	11767	-26181	P	-t	0.6723	1.6583	0.5908	336.4	172.9	-
63	24	-0099	Apr 22	16:55:24	11569	-25958	P	-t	0.7505	1.5145	0.4477	327.5	154.2	-
64	25	-0081	May 03	23:26:13	11373	-25735	P	-t	0.8328	1.3633	0.2969	316.5	128.7	-
65	26	-0063	May 14	05:51:46	11181	-25512	P	-t	0.9184	1.2063	0.1399	303.4	90.5	-
66	27	-0045	May 25	12:14:35	10992	-25289	Nx	-t	1.0057	1.0463	-0.0204	287.7	-	-
67	28	-0027	Jun 04	18:33:47	10805	-25066	N	-t	1.0949	0.8829	-0.1846	269.1	-	-
68	29	-0009	Jun 16	00:54:24	10621	-24843	N	-t	1.1822	0.7233	-0.3452	247.7	-	-
69	30	0009	Jun 26	07:15:25	10439	-24620	N	-t	1.2681	0.5664	-0.5037	222.8	-	-
70	31	0027	Jul 07	13:40:37	10259	-24397	N	-t	1.3501	0.4167	-0.6551	194.0	-	-
71	32	0045	Jul 17	20:09:29	10081	-24174	N	-t	1.4287	0.2737	-0.8003	159.3	-	-
72	33	0063	Jul 29	02:46:05	9905	-23951	N	-t	1.5007	0.1426	-0.9336	116.4	-	-
73	34	0081	Aug 08	09:29:38	9730	-23728	Ne	-t	1.5667	0.0230	-1.0558	47.3	-	-

SAROS SERIES

Saros series 50 contains 73 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-35	-1134 Jul 03 18:28:54	27771 -38757	Nb	t-	1.5265	0.0674	-0.9532	75.6	-	-	-	-	-
02	-34	-1116 Jul 14 01:28:20	27432 -38534	N	t-	1.4635	0.1858	-0.8406	124.9	-	-	-	-	-
03	-33	-1098 Jul 25 08:32:26	27096 -38311	N	t-	1.4048	0.2966	-0.7359	156.9	-	-	-	-	-
04	-32	-1080 Aug 04 15:42:43	26762 -38088	N	t-	1.3516	0.3975	-0.6414	180.8	-	-	-	-	-
05	-31	-1062 Aug 15 23:00:01	26430 -37865	N	t-	1.3044	0.4875	-0.5580	199.5	-	-	-	-	-
06	-30	-1044 Aug 26 06:23:43	26100 -37642	N	t-	1.2627	0.5673	-0.4848	214.5	-	-	-	-	-
07	-29	-1026 Sep 06 13:56:06	25772 -37419	N	t-	1.2285	0.6332	-0.4252	226.2	-	-	-	-	-
08	-28	-1008 Sep 16 21:36:04	25446 -37196	N	t-	1.2009	0.6870	-0.3777	235.4	-	-	-	-	-
09	-27	-0990 Sep 28 05:23:39	25122 -36973	N	t-	1.1798	0.7287	-0.3418	242.4	-	-	-	-	-
10	-26	-0972 Oct 08 13:17:41	24800 -36750	N	t-	1.1643	0.7599	-0.3161	247.7	-	-	-	-	-
11	-25	-0954 Oct 19 21:17:59	24481 -36527	N	t-	1.1542	0.7808	-0.3000	251.5	-	-	-	-	-
12	-24	-0936 Oct 30 05:23:10	24163 -36304	N	t-	1.1485	0.7934	-0.2916	254.0	-	-	-	-	-
13	-23	-0918 Nov 10 13:30:28	23848 -36081	N	t-	1.1452	0.8011	-0.2872	255.8	-	-	-	-	-
14	-22	-0900 Nov 20 21:40:24	23534 -35858	N	t-	1.1444	0.8040	-0.2871	256.8	-	-	-	-	-
15	-21	-0882 Dec 02 05:49:01	23223 -35635	N	t-	1.1434	0.8068	-0.2861	257.8	-	-	-	-	-
16	-20	-0864 Dec 12 13:56:12	22913 -35412	N	t-	1.1414	0.8110	-0.2829	258.9	-	-	-	-	-
17	-19	-0846 Dec 23 21:57:32	22606 -35189	N	t-	1.1352	0.8224	-0.2718	260.9	-	-	-	-	-

18	-18	-0827	Jan 03	05:54:59	22301	-34966	N	t-	1.1264	0.8383	-0.2555	263.4	-	-
19	-17	-0809	Jan 14	13:44:07	21998	-34743	N	t-	1.1118	0.8646	-0.2282	267.1	-	-
20	-16	-0791	Jan 24	21:25:18	21697	-34520	N	t-	1.0909	0.9022	-0.1890	272.0	-	-
21	-15	-0773	Feb 05	04:56:20	21398	-34297	N	t-	1.0621	0.9540	-0.1352	278.5	-	-
22	-14	-0755	Feb 15	12:18:31	21101	-34074	Nx	t-	1.0263	1.0185	-0.0684	285.9	-	-
23	-13	-0737	Feb 26	19:30:20	20806	-33851	P	t-	0.9823	1.0980	0.0136	294.5	28.8	-
24	-12	-0719	Mar 09	02:32:11	20513	-33628	P	t-	0.9305	1.1917	0.1100	303.8	80.7	-
25	-11	-0701	Mar 20	09:24:35	20223	-33405	P	t-	0.8709	1.2998	0.2207	313.5	112.6	-
26	-10	-0683	Mar 30	16:08:39	19934	-33182	P	t-	0.8043	1.4207	0.3442	323.2	138.1	-
27	-09	-0665	Apr 10	22:44:33	19648	-32959	P	t-	0.7310	1.5541	0.4800	332.7	159.8	-
28	-08	-0647	Apr 21	05:14:14	19363	-32736	P	t-	0.6523	1.6973	0.6253	341.6	178.1	-
29	-07	-0629	May 02	11:38:28	19081	-32513	P	t-	0.5689	1.8495	0.7794	349.6	193.7	-
30	-06	-0611	May 12	18:00:01	18800	-32290	P	t-	0.4830	2.0064	0.9377	356.6	206.4	-
31	-05	-0593	May 24	00:17:59	18522	-32067	T	t-	0.3938	2.1695	1.1019	362.3	216.8	51.4
32	-04	-0575	Jun 03	06:37:20	18246	-31844	T	tp	0.3053	2.3315	1.2647	366.8	224.6	78.3
33	-03	-0557	Jun 14	12:56:46	17972	-31621	T+	pp	0.2163	2.4946	1.4282	369.9	230.1	93.4
34	-02	-0539	Jun 24	19:21:28	17700	-31398	T+	pp	0.1312	2.6508	1.5843	371.7	233.4	101.8
35	-01	-0521	Jul 06	01:48:34	17430	-31175	T+	pp	0.0477	2.8042	1.7374	372.4	234.9	105.7
36	00	-0503	Jul 16	08:24:17	17162	-30952	T-	pp	-0.0296	2.8377	1.7702	372.0	234.7	105.9
37	01	-0485	Jul 27	15:05:43	16849	-30729	T-	pp	-0.1028	2.7038	1.6353	370.8	233.1	103.1
38	02	-0467	Aug 06	21:57:12	16537	-30506	T-	pp	-0.1684	2.5840	1.5145	369.0	230.5	97.9
39	03	-0449	Aug 18	04:56:55	16233	-30283	T-	pp	-0.2278	2.4756	1.4048	366.6	227.2	90.8
40	04	-0431	Aug 28	12:08:33	15938	-30060	T	pp	-0.2782	2.3839	1.3117	364.1	223.6	82.4
41	05	-0413	Sep 08	19:30:02	15651	-29837	T	-p	-0.3213	2.3055	1.2321	361.6	219.9	73.0
42	06	-0395	Sep 19	03:02:04	15371	-29614	T	-p	-0.3565	2.2413	1.1669	359.1	216.4	63.2
43	07	-0377	Sep 30	10:44:01	15098	-29391	T	-p	-0.3842	2.1910	1.1158	356.8	213.3	53.4
44	08	-0359	Oct 10	18:35:59	14832	-29168	T	-p	-0.4041	2.1546	1.0791	354.8	210.7	44.6
45	09	-0341	Oct 22	02:35:49	14572	-28945	T	-p	-0.4184	2.1283	1.0528	353.0	208.7	36.6

46	10	-0323 Nov 01	10:42:41	14317	-28722	T	-p	-0.4274	2.1114	1.0366	351.5	207.2	30.6
47	11	-0305 Nov 12	18:55:06	14069	-28499	T	-p	-0.4327	2.1010	1.0276	350.1	206.2	26.6
48	12	-0287 Nov 23	03:12:00	13826	-28276	T	-p	-0.4348	2.0962	1.0248	348.8	205.5	25.1
49	13	-0269 Dec 04	11:29:58	13588	-28053	T	-p	-0.4365	2.0917	1.0230	347.5	204.9	24.2
50	14	-0251 Dec 14	19:49:11	13355	-27830	T	-p	-0.4378	2.0874	1.0222	346.0	204.3	23.7
51	15	-0233 Dec 26	04:06:15	13126	-27607	T	-p	-0.4416	2.0785	1.0175	344.4	203.5	21.0
52	16	-0214 Jan 05	12:20:59	12903	-27384	T	-p	-0.4480	2.0643	1.0081	342.4	202.4	14.3
53	17	-0196 Jan 16	20:30:01	12683	-27161	P	-p	-0.4598	2.0398	0.9889	340.0	200.6	-
54	18	-0178 Jan 27	04:34:54	12468	-26938	P	-t	-0.4758	2.0075	0.9625	337.2	198.4	-
55	19	-0160 Feb 07	12:32:51	12257	-26715	P	-t	-0.4980	1.9637	0.9248	333.9	195.3	-
56	20	-0142 Feb 17	20:23:30	12050	-26492	P	-t	-0.5273	1.9067	0.8744	329.8	191.0	-
57	21	-0124 Feb 29	04:06:47	11847	-26269	P	-t	-0.5634	1.8372	0.8114	325.1	185.5	-
58	22	-0106 Mar 11	11:43:08	11647	-26046	P	-t	-0.6060	1.7556	0.7365	319.5	178.5	-
59	23	-0088 Mar 21	19:13:00	11450	-25823	P	-t	-0.6547	1.6630	0.6503	313.0	169.6	-
60	24	-0070 Apr 02	02:35:39	11257	-25600	P	-t	-0.7100	1.5584	0.5521	305.4	158.3	-
61	25	-0052 Apr 12	09:53:46	11066	-25377	P	-t	-0.7698	1.4456	0.4452	296.6	144.0	-
62	26	-0034 Apr 23	17:06:58	10878	-25154	P	-h	-0.8346	1.3239	0.3290	286.5	125.6	-
63	27	-0016 May 04	00:17:18	10693	-24931	P	-h	-0.9024	1.1969	0.2071	275.1	101.1	-
64	28	0002 May 15	07:24:42	10510	-24708	P	-h	-0.9732	1.0647	0.0795	262.0	63.5	-
65	29	0020 May 25	14:32:20	10330	-24485	N	-h	-1.0447	0.9315	-0.0497	247.5	-	-
66	30	0038 Jun 05	21:40:23	10151	-24262	N	-h	-1.1165	0.7980	-0.1798	231.4	-	-
67	31	0056 Jun 16	04:50:14	9974	-24039	N	-a	-1.1878	0.6659	-0.3092	213.4	-	-
68	32	0074 Jun 27	12:03:48	9798	-23816	N	-a	-1.2566	0.5384	-0.4345	193.6	-	-
69	33	0092 Jul 07	19:21:59	9624	-23593	N	-a	-1.3227	0.4165	-0.5548	171.7	-	-
70	34	0110 Jul 19	02:46:36	9451	-23370	N	-a	-1.3840	0.3034	-0.6669	147.6	-	-
71	35	0128 Jul 29	10:16:54	9279	-23147	N	-a	-1.4415	0.1976	-0.7722	120.0	-	-
72	36	0146 Aug 09	17:55:43	9107	-22924	N	-a	-1.4930	0.1032	-0.8666	87.2	-	-
73	37	0164 Aug 20	01:42:21	8936	-22701	Ne	-a	-1.5391	0.0188	-0.9514	37.4	-	-

SAROS SERIES

51

Saros series 51 contains 73 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-36	-1105 Jun 13	02:00:33	27229	-38399	Nb t-	-1.5694	0.0050	-1.0479	21.5	-	-		
02	-35	-1087 Jun 23	08:32:46	26894	-38176	N t-	-1.4856	0.1580	-0.8937	119.5	-	-		
03	-34	-1069 Jul 04	15:11:30	26561	-37953	N t-	-1.4061	0.3036	-0.7474	163.0	-	-		
04	-33	-1051 Jul 14	21:57:25	26230	-37730	N t-	-1.3312	0.4408	-0.6097	193.4	-	-		
05	-32	-1033 Jul 26	04:52:29	25901	-37507	N t-	-1.2622	0.5673	-0.4831	216.1	-	-		
06	-31	-1015 Aug 05	11:56:21	25574	-37284	N t-	-1.1992	0.6829	-0.3676	233.8	-	-		
07	-30	-0997 Aug 16	19:11:41	25250	-37061	N t-	-1.1443	0.7839	-0.2669	247.3	-	-		
08	-29	-0979 Aug 27	02:37:29	24927	-36838	N h-	-1.0969	0.8710	-0.1802	257.7	-	-		
09	-28	-0961 Sep 07	10:13:45	24607	-36615	N h-	-1.0571	0.9443	-0.1072	265.5	-	-		

10	-27	-0943	Sep 17	18:00:29	24288	-36392	Nx h-	-1.0247	1.0037	-0.0479	271.2	-	-
11	-26	-0925	Sep 29	01:57:48	23972	-36169	Nx a-	-0.9999	1.0493	-0.0023	275.1	-	-
12	-25	-0907	Oct 09	10:04:01	23658	-35946	P a-	-0.9817	1.0823	0.0312	277.6	41.5	-
13	-24	-0889	Oct 20	18:17:41	23345	-35723	P a-	-0.9688	1.1057	0.0554	279.0	55.0	-
14	-23	-0871	Oct 31	02:38:05	23035	-35500	P a-	-0.9606	1.1200	0.0712	279.4	62.0	-
15	-22	-0853	Nov 11	11:04:10	22727	-35277	P a-	-0.9561	1.1271	0.0803	279.1	65.6	-
16	-21	-0835	Nov 21	19:32:32	22421	-35054	P a-	-0.9528	1.1318	0.0877	278.5	68.2	-
17	-20	-0817	Dec 03	04:02:50	22117	-34831	P a-	-0.9504	1.1346	0.0937	277.8	70.3	-
18	-19	-0799	Dec 13	12:31:58	21815	-34608	P a-	-0.9461	1.1405	0.1036	277.2	73.6	-
19	-18	-0781	Dec 24	21:00:21	21516	-34385	P a-	-0.9406	1.1484	0.1160	276.8	77.5	-
20	-17	-0762	Jan 04	05:23:14	21218	-34162	P a-	-0.9295	1.1661	0.1388	277.2	84.2	-
21	-16	-0744	Jan 15	13:43:15	20922	-33939	P a-	-0.9152	1.1895	0.1678	278.0	92.0	-
22	-15	-0726	Jan 25	21:55:49	20629	-33716	P a-	-0.8938	1.2259	0.2100	279.9	102.0	-
23	-14	-0708	Feb 06	06:02:45	20337	-33493	P a-	-0.8670	1.2719	0.2622	282.3	112.7	-
24	-13	-0690	Feb 16	14:00:54	20048	-33270	P a-	-0.8321	1.3328	0.3295	285.7	124.8	-
25	-12	-0672	Feb 27	21:53:30	19760	-33047	P a-	-0.7917	1.4038	0.4067	289.5	136.6	-
26	-11	-0654	Mar 10	05:38:03	19475	-32824	P a-	-0.7435	1.4890	0.4982	293.9	148.7	-
27	-10	-0636	Mar 20	13:15:57	19192	-32601	P a-	-0.6890	1.5860	0.6012	298.4	160.3	-
28	-09	-0618	Mar 31	20:47:27	18911	-32378	P a-	-0.6285	1.6941	0.7149	303.0	171.1	-
29	-08	-0600	Apr 11	04:14:20	18632	-32155	P a-	-0.5634	1.8109	0.8371	307.4	180.9	-
30	-07	-0582	Apr 22	11:36:24	18355	-31932	P a-	-0.4934	1.9369	0.9678	311.4	189.5	-
31	-06	-0564	May 02	18:55:07	18080	-31709	T a-	-0.4198	2.0698	1.1050	314.9	197.0	47.9
32	-05	-0546	May 14	02:12:20	17807	-31486	T a-	-0.3442	2.2069	1.2457	317.8	203.0	69.9
33	-04	-0528	May 24	09:29:11	17536	-31263	T- p-	-0.2677	2.3457	1.3875	319.9	207.6	83.4
34	-03	-0510	Jun 04	16:46:12	17268	-31040	T- p-	-0.1907	2.4858	1.5299	321.3	210.9	92.2
35	-02	-0492	Jun 15	00:05:46	16974	-30817	T- p-	-0.1151	2.6237	1.6695	322.0	212.9	97.4
36	-01	-0474	Jun 26	07:28:35	16659	-30594	T- pp	-0.0417	2.7578	1.8046	321.9	213.6	99.8
37	00	-0456	Jul 06	14:56:35	16352	-30371	T+ pp	0.0278	2.7830	1.8303	321.3	213.3	99.8

38	01	-0438	Jul 17	22:28:37	16054	-30148	T+	pp	0.0946	2.6607	1.7077	320.2	212.0	97.8
39	02	-0420	Jul 28	06:08:44	15764	-29925	T+	-p	0.1547	2.5507	1.5970	318.7	210.1	94.3
40	03	-0402	Aug 08	13:54:55	15481	-29702	T+	-p	0.2101	2.4497	1.4949	317.0	207.7	89.3
41	04	-0384	Aug 18	21:50:18	15205	-29479	T+	-p	0.2581	2.3624	1.4060	315.2	205.0	83.6
42	05	-0366	Aug 30	05:52:34	14936	-29256	T	-p	0.3006	2.2854	1.3271	313.4	202.3	77.0
43	06	-0348	Sep 09	14:04:56	14673	-29033	T	-p	0.3347	2.2237	1.2634	311.8	199.7	70.6
44	07	-0330	Sep 20	22:24:32	14417	-28810	T	-p	0.3630	2.1730	1.2105	310.4	197.3	64.1
45	08	-0312	Oct 01	06:52:17	14166	-28587	T	-p	0.3845	2.1345	1.1700	309.2	195.4	58.3
46	09	-0294	Oct 12	15:27:02	13921	-28364	T	-p	0.4004	2.1064	1.1398	308.4	193.8	53.3
47	10	-0276	Oct 23	00:08:53	13681	-28141	T	-p	0.4107	2.0884	1.1200	307.9	192.8	49.7
48	11	-0258	Nov 03	08:55:38	13446	-27918	T	-p	0.4168	2.0780	1.1081	307.6	192.1	47.3
49	12	-0240	Nov 13	17:45:53	13216	-27695	T	-p	0.4202	2.0722	1.1012	307.5	191.7	45.8
50	13	-0222	Nov 25	02:38:57	12990	-27472	T	-p	0.4214	2.0703	1.0987	307.5	191.6	45.3
51	14	-0204	Dec 05	11:33:13	12769	-27249	T	-p	0.4221	2.0692	1.0974	307.6	191.6	45.0
52	15	-0186	Dec 16	20:26:04	12553	-27026	T	-p	0.4239	2.0658	1.0942	307.6	191.5	44.3
53	16	-0168	Dec 27	05:16:35	12340	-26803	T	-p	0.4278	2.0583	1.0873	307.4	191.3	42.8
54	17	-0149	Jan 07	14:02:52	12131	-26580	T	-a	0.4354	2.0439	1.0739	307.1	190.7	39.6
55	18	-0131	Jan 17	22:44:32	11926	-26357	T	-a	0.4468	2.0223	1.0537	306.5	189.8	34.0
56	19	-0113	Jan 29	07:18:26	11725	-26134	T	-a	0.4647	1.9887	1.0215	305.6	188.2	21.8
57	20	-0095	Feb 08	15:45:57	11527	-25911	P	-a	0.4879	1.9452	0.9798	304.2	185.9	-
58	21	-0077	Feb 20	00:04:33	11332	-25688	P	-a	0.5184	1.8886	0.9247	302.3	182.7	-
59	22	-0059	Mar 02	08:15:01	11141	-25465	P	-a	0.5553	1.8199	0.8577	299.7	178.3	-
60	23	-0041	Mar 13	16:16:04	10952	-25242	P	-a	0.5999	1.7374	0.7765	296.4	172.3	-
61	24	-0023	Mar 24	00:09:25	10766	-25019	P	-a	0.6505	1.6440	0.6843	292.1	164.5	-
62	25	-0005	Apr 04	07:54:39	10582	-24796	P	-a	0.7076	1.5390	0.5799	286.8	154.3	-
63	26	0013	Apr 14	15:31:46	10401	-24573	P	-a	0.7709	1.4226	0.4638	280.2	140.8	-
64	27	0031	Apr 25	23:02:48	10221	-24350	P	-a	0.8386	1.2986	0.3395	272.2	123.0	-
65	28	0049	May 06	06:27:57	10044	-24127	P	-a	0.9106	1.1669	0.2070	262.6	98.1	-

											PHASE			
											DURATIONS			
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE				MAG.	MAG.	m	m	m
GREATEST														
ECLIPSE														

01	-37	-1076	May 23	05:40:35	26692	-38041	Nb	a-	1.5114	0.0562	-0.8874	63.2	-	-
02	-36	-1058	Jun 03	13:02:23	26360	-37818	N	a-	1.4374	0.1916	-0.7511	115.1	-	-
03	-35	-1040	Jun 13	20:27:44	26030	-37595	N	a-	1.3658	0.3228	-0.6197	147.5	-	-
04	-34	-1022	Jun 25	03:55:10	25703	-37372	N	a-	1.2953	0.4523	-0.4906	172.3	-	-
05	-33	-1004	Jul 05	11:27:15	25377	-37149	N	a-	1.2284	0.5757	-0.3682	192.0	-	-
06	-32	-0986	Jul 16	19:04:31	25054	-36926	N	a-	1.1653	0.6923	-0.2534	208.0	-	-
07	-31	-0968	Jul 27	02:48:30	24733	-36703	N	a-	1.1076	0.7992	-0.1486	221.1	-	-
08	-30	-0950	Aug 07	10:39:49	24414	-36480	N	a-	1.0558	0.8956	-0.0548	231.9	-	-
09	-29	-0932	Aug 17	18:37:59	24096	-36257	P	a-	1.0097	0.9817	0.0284	240.7	36.6	-
10	-28	-0914	Aug 29	02:45:02	23781	-36034	P	a-	0.9708	1.0546	0.0981	247.7	67.3	-
11	-27	-0896	Sep 08	10:59:19	23468	-35811	P	a-	0.9380	1.1165	0.1566	253.5	84.4	-
12	-26	-0878	Sep 19	19:22:00	23157	-35588	P	a-	0.9125	1.1651	0.2018	257.9	95.2	-
13	-25	-0860	Sep 30	03:51:26	22848	-35365	P	a-	0.8928	1.2029	0.2363	261.3	102.6	-
14	-24	-0842	Oct 11	12:28:31	22542	-35142	P	a-	0.8796	1.2287	0.2589	263.7	107.1	-
15	-23	-0824	Oct 21	21:10:42	22237	-34919	P	a-	0.8711	1.2458	0.2732	265.4	109.8	-
16	-22	-0806	Nov 02	05:57:38	21934	-34696	P	a-	0.8667	1.2551	0.2799	266.5	111.2	-
17	-21	-0788	Nov 12	14:47:39	21634	-34473	P	a-	0.8653	1.2587	0.2814	267.2	111.6	-
18	-20	-0770	Nov 23	23:39:56	21335	-34250	P	a-	0.8665	1.2574	0.2784	267.6	111.2	-
19	-19	-0752	Dec 04	08:31:17	21039	-34027	P	a-	0.8670	1.2570	0.2769	268.0	111.0	-
20	-18	-0734	Dec 15	17:21:11	20744	-33804	P	a-	0.8668	1.2578	0.2769	268.5	111.2	-
21	-17	-0716	Dec 26	02:07:12	20452	-33581	P	a-	0.8640	1.2630	0.2819	269.4	112.3	-
22	-16	-0697	Jan 06	10:49:38	20162	-33358	P	a-	0.8588	1.2725	0.2915	270.6	114.3	-
23	-15	-0679	Jan 16	19:23:58	19874	-33135	P	a-	0.8476	1.2928	0.3122	272.6	118.1	-
24	-14	-0661	Jan 28	03:52:26	19587	-32912	P	a-	0.8323	1.3208	0.3407	275.2	123.2	-
25	-13	-0643	Feb 07	12:10:50	19303	-32689	P	a-	0.8091	1.3628	0.3835	278.8	130.1	-
26	-12	-0625	Feb 18	20:22:18	19022	-32466	P	a-	0.7811	1.4140	0.4353	282.9	137.9	-
27	-11	-0607	Mar 01	04:22:11	18742	-32243	P	a-	0.7443	1.4811	0.5030	288.0	147.1	-
28	-10	-0589	Mar 12	12:14:59	18464	-32020	P	a-	0.7025	1.5578	0.5800	293.4	156.5	-

29 -09 -0571 Mar 22 19:57:06 18188 -31797 P a- 0.6525 1.6494 0.6716 299.4 166.4 -
 30 -08 -0553 Apr 03 03:31:45 17914 -31574 P a- 0.5971 1.7512 0.7732 305.5 176.1 -
 31 -07 -0535 Apr 13 10:57:01 17643 -31351 P a- 0.5345 1.8664 0.8876 311.8 185.5 -
 32 -06 -0517 Apr 24 18:16:43 17373 -31128 T a- 0.4681 1.9889 1.0089 317.8 194.1 14.5
 33 -05 -0499 May 05 01:29:45 17102 -30905 T p- 0.3969 2.1205 1.1385 323.5 201.9 55.2
 34 -04 -0481 May 16 08:38:03 16782 -30682 T p- 0.3226 2.2581 1.2738 328.6 208.6 74.5
 35 -03 -0463 May 26 15:42:49 16472 -30459 T+ pp 0.2460 2.4002 1.4129 333.2 214.0 87.2
 36 -02 -0445 Jun 06 22:46:02 16171 -30236 T+ pp 0.1686 2.5441 1.5531 337.0 218.2 95.7
 37 -01 -0427 Jun 17 05:48:19 15877 -30013 T+ pp 0.0914 2.6879 1.6927 340.0 221.0 100.7
 38 00 -0409 Jun 28 12:50:51 15592 -29790 T+ pp 0.0152 2.8300 1.8301 342.3 222.5 102.7
 39 01 -0391 Jul 08 19:55:44 15313 -29567 T- pp -0.0581 2.7540 1.7488 343.8 222.8 102.1
 40 02 -0373 Jul 20 03:04:02 15041 -29344 T- pp -0.1278 2.6290 1.6181 344.7 222.0 99.0
 41 03 -0355 Jul 30 10:15:53 14776 -29121 T- -p -0.1936 2.5113 1.4943 345.0 220.2 93.6
 42 04 -0337 Aug 10 17:33:53 14517 -28898 T- -p -0.2533 2.4049 1.3815 344.9 217.7 86.2
 43 05 -0319 Aug 21 00:57:54 14264 -28675 T -p -0.3069 2.3099 1.2800 344.6 214.7 76.8
 44 06 -0301 Sep 01 08:29:56 14017 -28452 T -a -0.3532 2.2283 1.1918 344.2 211.5 65.6
 45 07 -0283 Sep 11 16:07:33 13775 -28229 T -a -0.3939 2.1570 1.1139 343.8 208.2 52.0
 46 08 -0265 Sep 22 23:53:54 13538 -28006 T -a -0.4265 2.1003 1.0508 343.5 205.3 35.5
 47 09 -0247 Oct 03 07:46:31 13306 -27783 P -a -0.4532 2.0545 0.9988 343.5 202.7 -
 48 10 -0229 Oct 14 15:46:26 13079 -27560 P -a -0.4730 2.0210 0.9597 343.7 200.6 -
 49 11 -0211 Oct 24 23:51:25 12856 -27337 P -a -0.4879 1.9963 0.9297 344.1 199.1 -
 50 12 -0193 Nov 05 08:01:50 12638 -27114 P -a -0.4977 1.9805 0.9094 344.8 198.1 -
 51 13 -0175 Nov 15 16:15:09 12423 -26891 P -a -0.5045 1.9701 0.8949 345.7 197.5 -
 52 14 -0157 Nov 27 00:29:42 12213 -26668 P -a -0.5096 1.9624 0.8841 346.5 197.2 -
 53 15 -0139 Dec 07 08:44:35 12007 -26445 P -h -0.5138 1.9560 0.8751 347.3 196.9 -
 54 16 -0121 Dec 18 16:57:23 11804 -26222 P -h -0.5185 1.9481 0.8656 347.9 196.6 -
 55 17 -0103 Dec 29 01:06:13 11605 -25999 P -t -0.5262 1.9345 0.8509 348.1 195.9 -
 56 18 -0084 Jan 09 09:08:56 11409 -25776 P -t -0.5382 1.9127 0.8288 347.9 194.5 -

57	19	-0066	Jan 19	17:05:12	11216	-25553	P	-t	-0.5546	1.8824	0.7988	347.2	192.4	-
58	20	-0048	Jan 31	00:53:19	11026	-25330	P	-t	-0.5769	1.8411	0.7583	345.8	189.2	-
59	21	-0030	Feb 10	08:31:13	10839	-25107	P	-t	-0.6068	1.7857	0.7041	343.5	184.3	-
60	22	-0012	Feb 21	15:59:42	10654	-24884	P	-t	-0.6436	1.7174	0.6372	340.1	177.7	-
61	23	0006	Mar 03	23:17:23	10472	-24661	P	-t	-0.6887	1.6337	0.5552	335.6	168.4	-
62	24	0024	Mar 14	06:25:48	10292	-24438	P	-t	-0.7407	1.5375	0.4608	329.6	156.0	-
63	25	0042	Mar 25	13:23:08	10113	-24215	P	-t	-0.8009	1.4262	0.3512	321.9	138.7	-
64	26	0060	Apr 04	20:12:30	9937	-23992	P	-t	-0.8670	1.3040	0.2307	312.3	114.6	-
65	27	0078	Apr 16	02:53:06	9762	-23769	P	-t	-0.9397	1.1698	0.0980	300.5	76.2	-
66	28	0096	Apr 26	09:26:31	9588	-23546	Nx	-t	-1.0177	1.0262	-0.0444	285.9	-	-
67	29	0114	May 07	15:53:58	9415	-23323	N	-t	-1.0998	0.8749	-0.1947	268.3	-	-
68	30	0132	May 17	22:17:24	9243	-23100	N	-t	-1.1847	0.7189	-0.3501	247.2	-	-
69	31	0150	May 29	04:38:46	9071	-22877	N	-t	-1.2706	0.5612	-0.5076	221.8	-	-
70	32	0168	Jun 08	10:57:46	8900	-22654	N	-t	-1.3577	0.4014	-0.6675	190.5	-	-
71	33	0186	Jun 19	17:18:41	8729	-22431	N	-t	-1.4429	0.2454	-0.8241	151.1	-	-
72	34	0204	Jun 29	23:41:02	8558	-22208	Ne	-t	-1.5265	0.0924	-0.9779	94.0	-	-

SAROS SERIES

53

Saros series 53 contains 72 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-34	-0993 Jun 05 15:41:34	25181 -37014	Nb	t-	-1.5151	0.0869	-0.9312	85.8	-	-	-	-	-
02	-33	-0975 Jun 15 22:28:08	24859 -36791	N	t-	-1.4416	0.2242	-0.7984	136.7	-	-	-	-	-
03	-32	-0957 Jun 27 05:17:36	24539 -36568	N	t-	-1.3708	0.3565	-0.6711	171.1	-	-	-	-	-
04	-31	-0939 Jul 07 12:08:28	24221 -36345	N	t-	-1.3019	0.4856	-0.5473	198.2	-	-	-	-	-
05	-30	-0921 Jul 18 19:04:05	23905 -36122	N	t-	-1.2373	0.6070	-0.4316	220.0	-	-	-	-	-
06	-29	-0903 Jul 29 02:03:46	23592 -35899	N	t-	-1.1765	0.7216	-0.3230	238.3	-	-	-	-	-
07	-28	-0885 Aug 09 09:11:02	23280 -35676	N	t-	-1.1223	0.8242	-0.2266	253.2	-	-	-	-	-
08	-27	-0867 Aug 19 16:24:54	22970 -35453	N	t-	-1.0743	0.9155	-0.1417	265.5	-	-	-	-	-
09	-26	-0849 Aug 30 23:45:28	22662 -35230	N	t-	-1.0324	0.9956	-0.0678	275.8	-	-	-	-	-
10	-25	-0831 Sep 10 07:14:32	22357 -35007	Nx	t-	-0.9979	1.0620	-0.0075	284.0	-	-	-	-	-
11	-24	-0813 Sep 21 14:51:15	22053 -34784	P	t-	-0.9701	1.1158	0.0405	290.6	48.6	-	-	-	-
12	-23	-0795 Oct 01 22:36:08	21752 -34561	P	t-	-0.9495	1.1564	0.0757	295.6	66.2	-	-	-	-
13	-22	-0777 Oct 13 06:26:36	21453 -34338	P	t-	-0.9338	1.1877	0.1020	299.5	76.8	-	-	-	-
14	-21	-0759 Oct 23 14:24:26	21155 -34115	P	t-	-0.9246	1.2068	0.1168	302.2	82.2	-	-	-	-
15	-20	-0741 Nov 03 22:26:03	20860 -33892	P	t-	-0.9186	1.2196	0.1260	304.2	85.4	-	-	-	-
16	-19	-0723 Nov 14 06:31:01	20567 -33669	P	t-	-0.9157	1.2264	0.1300	305.6	86.8	-	-	-	-
17	-18	-0705 Nov 25 14:36:42	20276 -33446	P	t-	-0.9135	1.2314	0.1329	306.7	87.9	-	-	-	-
18	-17	-0687 Dec 05 22:42:47	19987 -33223	P	t-	-0.9118	1.2352	0.1356	307.6	88.8	-	-	-	-
19	-16	-0669 Dec 17 06:45:36	19700 -33000	P	t-	-0.9076	1.2430	0.1429	308.7	91.2	-	-	-	-
20	-15	-0651 Dec 27 14:44:25	19415 -32777	P	t-	-0.9005	1.2560	0.1563	310.2	95.3	-	-	-	-
21	-14	-0632 Jan 07 22:37:18	19133 -32554	P	t-	-0.8885	1.2773	0.1787	312.3	101.7	-	-	-	-

22	-13	-0614	Jan 18	06:23:46	18852	-32331	P	t-	-0.8714	1.3078	0.2109	315.1	110.1	-
23	-12	-0596	Jan 29	14:00:06	18573	-32108	P	t-	-0.8463	1.3527	0.2581	318.9	121.0	-
24	-11	-0578	Feb 08	21:28:32	18297	-31885	P	t-	-0.8150	1.4089	0.3169	323.4	133.0	-
25	-10	-0560	Feb 20	04:46:04	18022	-31662	P	t-	-0.7748	1.4812	0.3922	328.8	146.4	-
26	-09	-0542	Mar 02	11:55:56	17750	-31439	P	t-	-0.7281	1.5652	0.4794	334.5	159.7	-
27	-08	-0524	Mar 12	18:53:29	17479	-31216	P	t-	-0.6714	1.6676	0.5851	340.8	173.4	-
28	-07	-0506	Mar 24	01:44:46	17211	-30993	P	t-	-0.6093	1.7799	0.7007	347.0	186.2	-
29	-06	-0488	Apr 03	08:25:26	16907	-30770	P	t-	-0.5385	1.9082	0.8321	353.1	198.3	-
30	-05	-0470	Apr 14	15:01:14	16593	-30547	P	t-	-0.4633	2.0447	0.9716	358.5	208.8	-
31	-04	-0452	Apr 24	21:29:03	16289	-30324	T	t-	-0.3810	2.1943	1.1239	363.4	217.9	56.2
32	-03	-0434	May 06	03:54:57	15992	-30101	T	tp	-0.2967	2.3478	1.2799	367.2	225.1	80.0
33	-02	-0416	May 16	10:16:37	15703	-29878	T-	pp	-0.2087	2.5082	1.4423	370.0	230.4	94.4
34	-01	-0398	May 27	16:38:05	15422	-29655	T-	pp	-0.1199	2.6702	1.6061	371.5	233.7	102.7
35	00	-0380	Jun 06	22:59:28	15148	-29432	T-	pp	-0.0308	2.8332	1.7703	371.8	235.0	106.2
36	01	-0362	Jun 18	05:23:59	14880	-29209	T+	pp	0.0561	2.7863	1.7243	371.0	234.4	105.5
37	02	-0344	Jun 28	11:51:56	14619	-28986	T+	pp	0.1408	2.6305	1.5691	369.0	232.0	100.8
38	03	-0326	Jul 09	18:24:59	14364	-28763	T+	pp	0.2218	2.4819	1.4207	366.1	228.1	92.3
39	04	-0308	Jul 20	01:05:15	14114	-28540	T	pp	0.2971	2.3438	1.2823	362.4	222.8	79.5
40	05	-0290	Jul 31	07:53:26	13870	-28317	T	-t	0.3662	2.2172	1.1553	358.2	216.6	61.5
41	06	-0272	Aug 10	14:50:35	13631	-28094	T	-t	0.4286	2.1030	1.0405	353.6	209.8	32.5
42	07	-0254	Aug 21	21:57:32	13397	-27871	P	-t	0.4835	2.0027	0.9394	349.0	202.6	-
43	08	-0236	Sep 01	05:15:24	13168	-27648	P	-t	0.5303	1.9173	0.8532	344.6	195.7	-
44	09	-0218	Sep 12	12:43:55	12943	-27425	P	-t	0.5687	1.8471	0.7823	340.5	189.2	-
45	10	-0200	Sep 22	20:21:52	12723	-27202	P	-t	0.6002	1.7896	0.7242	336.7	183.4	-
46	11	-0182	Oct 04	04:10:42	12507	-26979	P	-t	0.6235	1.7470	0.6813	333.6	178.7	-
47	12	-0164	Oct 14	12:08:40	12296	-26756	P	-t	0.6404	1.7160	0.6504	331.0	175.1	-
48	13	-0146	Oct 25	20:15:14	12088	-26533	P	-t	0.6508	1.6966	0.6315	329.0	172.6	-
49	14	-0128	Nov 05	04:27:48	11884	-26310	P	-t	0.6572	1.6843	0.6203	327.3	170.9	-

50	15	-0110	Nov 16	12:46:28	11683	-26087	P	-t	0.6594	1.6795	0.6172	326.0	170.1	-
51	16	-0092	Nov 26	21:08:40	11486	-25864	P	-h	0.6596	1.6779	0.6180	324.8	169.7	-
52	17	-0074	Dec 08	05:32:02	11292	-25641	P	-h	0.6595	1.6765	0.6196	323.5	169.4	-
53	18	-0056	Dec 18	13:55:43	11101	-25418	P	-h	0.6600	1.6737	0.6205	322.1	169.1	-
54	19	-0038	Dec 29	22:17:13	10913	-25195	P	-h	0.6631	1.6658	0.6170	320.3	168.2	-
55	20	-0019	Jan 09	06:35:52	10727	-24972	P	-h	0.6692	1.6521	0.6083	318.2	166.8	-
56	21	-0001	Jan 20	14:48:33	10544	-24749	P	-h	0.6811	1.6275	0.5893	315.4	164.2	-
57	22	0017	Jan 30	22:56:51	10363	-24526	P	-h	0.6974	1.5946	0.5622	312.0	160.6	-
58	23	0035	Feb 11	06:57:48	10184	-24303	P	-h	0.7207	1.5488	0.5227	307.7	155.4	-
59	24	0053	Feb 21	14:51:48	10006	-24080	P	-h	0.7505	1.4908	0.4711	302.5	148.3	-
60	25	0071	Mar 04	22:38:14	9831	-23857	P	-h	0.7872	1.4201	0.4069	296.3	138.7	-
61	26	0089	Mar 15	06:18:11	9656	-23634	P	-h	0.8302	1.3379	0.3312	288.9	126.2	-
62	27	0107	Mar 26	13:51:50	9483	-23411	P	-h	0.8794	1.2445	0.2441	280.3	109.4	-
63	28	0125	Apr 05	21:18:32	9311	-23188	P	-h	0.9350	1.1394	0.1450	270.0	85.2	-
64	29	0143	Apr 17	04:40:57	9139	-22965	P	-h	0.9949	1.0267	0.0380	258.3	44.1	-
65	30	0161	Apr 27	11:58:38	8968	-22742	N	-h	1.0592	0.9060	-0.0774	244.7	-	-
66	31	0179	May 08	19:13:37	8797	-22519	N	-h	1.1264	0.7803	-0.1984	229.0	-	-
67	32	0197	May 19	02:26:09	8626	-22296	N	-a	1.1963	0.6500	-0.3245	210.9	-	-
68	33	0215	May 30	09:38:48	8455	-22073	N	-a	1.2666	0.5192	-0.4517	190.2	-	-
69	34	0233	Jun 09	16:52:15	8283	-21850	N	-a	1.3365	0.3894	-0.5785	166.2	-	-
70	35	0251	Jun 21	00:07:12	8111	-21627	N	-a	1.4057	0.2612	-0.7044	137.3	-	-
71	36	0269	Jul 01	07:26:01	7939	-21404	N	-a	1.4722	0.1383	-0.8256	100.7	-	-
72	37	0287	Jul 12	14:48:45	7766	-21181	Ne	-a	1.5359	0.0208	-0.9419	39.4	-	-

SAROS SERIES

54

Saros series 54 contains 72 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-35	-0946 May 26	05:47:39	24347	-36433	N t-	1.4859	0.1557	-0.8926	118.4	-	-		
02	-34	-0928 Jun 05	12:18:41	24030	-36210	N t-	1.3999	0.3123	-0.7336	164.8	-	-		
03	-33	-0910 Jun 16	18:53:44	23715	-35987	N t-	1.3158	0.4657	-0.5782	197.8	-	-		
04	-32	-0892 Jun 27	01:32:48	23403	-35764	N t-	1.2334	0.6162	-0.4262	223.5	-	-		
05	-31	-0874 Jul 08	08:19:15	23092	-35541	N t-	1.1556	0.7584	-0.2830	243.7	-	-		
06	-30	-0856 Jul 18	15:12:49	22784	-35318	N t-	1.0821	0.8928	-0.1478	260.0	-	-		
07	-29	-0838 Jul 29	22:16:04	22477	-35095	Nx t-	1.0155	1.0149	-0.0253	272.8	-	-		
08	-28	-0820 Aug 09	05:27:51	22173	-34872	P h-	0.9547	1.1264	0.0863	283.1	69.0	-		
09	-27	-0802 Aug 20	12:50:51	21871	-34649	P h-	0.9017	1.2236	0.1836	291.0	98.9	-		
10	-26	-0784 Aug 30	20:23:51	21571	-34426	P h-	0.8558	1.3079	0.2678	297.1	117.7	-		
11	-25	-0766 Sep 11	04:07:19	21272	-34203	P a-	0.8174	1.3783	0.3381	301.6	130.5	-		
12	-24	-0748 Sep 21	12:01:20	20976	-33980	P a-	0.7867	1.4346	0.3945	304.8	139.3	-		
13	-23	-0730 Oct 02	20:05:10	20683	-33757	P a-	0.7633	1.4774	0.4377	306.8	145.3	-		

14	-22	-0712	Oct 13	04:18:31	20391	-33534	P	a-	0.7466	1.5078	0.4687	307.8	149.2	-
15	-21	-0694	Oct 24	12:38:06	20101	-33311	P	a-	0.7340	1.5303	0.4923	308.2	151.8	-
16	-20	-0676	Nov 03	21:05:09	19813	-33088	P	a-	0.7268	1.5427	0.5062	308.0	153.2	-
17	-19	-0658	Nov 15	05:36:02	19527	-32865	P	a-	0.7223	1.5499	0.5155	307.3	153.9	-
18	-18	-0640	Nov 25	14:10:23	19244	-32642	P	a-	0.7197	1.5532	0.5216	306.4	154.2	-
19	-17	-0622	Dec 06	22:44:25	18962	-32419	P	a-	0.7165	1.5574	0.5292	305.5	154.7	-
20	-16	-0604	Dec 17	07:18:47	18683	-32196	P	a-	0.7128	1.5622	0.5380	304.6	155.3	-
21	-15	-0586	Dec 28	15:50:05	18406	-31973	P	a-	0.7061	1.5723	0.5526	304.0	156.6	-
22	-14	-0567	Jan 08	00:17:34	18130	-31750	P	a-	0.6957	1.5888	0.5741	303.7	158.6	-
23	-13	-0549	Jan 19	08:39:30	17857	-31527	P	a-	0.6802	1.6144	0.6051	303.9	161.6	-
24	-12	-0531	Jan 29	16:55:54	17586	-31304	P	a-	0.6596	1.6494	0.6458	304.5	165.4	-
25	-11	-0513	Feb 10	01:04:34	17317	-31081	P	a-	0.6320	1.6971	0.6995	305.8	170.2	-
26	-10	-0495	Feb 20	09:06:27	17033	-30858	P	a-	0.5979	1.7565	0.7649	307.4	175.6	-
27	-09	-0477	Mar 03	17:00:44	16716	-30635	P	a-	0.5569	1.8287	0.8432	309.5	181.5	-
28	-08	-0459	Mar 14	00:49:13	16408	-30412	P	a-	0.5105	1.9111	0.9313	311.6	187.3	-
29	-07	-0441	Mar 25	08:28:55	16108	-30189	T	a-	0.4557	2.0087	1.0346	314.0	193.3	28.1
30	-06	-0423	Apr 04	16:04:29	15816	-29966	T	a-	0.3967	2.1143	1.1453	316.3	198.7	55.5
31	-05	-0405	Apr 15	23:33:23	15532	-29743	T	a-	0.3312	2.2321	1.2679	318.3	203.6	72.4
32	-04	-0387	Apr 26	07:00:12	15255	-29520	T+	p-	0.2635	2.3543	1.3943	319.9	207.6	83.8
33	-03	-0369	May 07	14:21:30	14985	-29297	T+	p-	0.1904	2.4865	1.5303	321.1	210.7	92.1
34	-02	-0351	May 17	21:43:30	14721	-29074	T+	p-	0.1172	2.6193	1.6661	321.6	212.7	97.3
35	-01	-0333	May 29	05:03:18	14464	-28851	T+	pp	0.0413	2.7573	1.8065	321.5	213.5	99.8
36	00	-0315	Jun 08	12:25:00	14212	-28628	T-	pp	-0.0333	2.7711	1.8220	320.8	213.2	99.8
37	01	-0297	Jun 19	19:47:02	13966	-28405	T-	pp	-0.1081	2.6334	1.6853	319.4	211.8	97.4
38	02	-0279	Jun 30	03:13:49	13725	-28182	T-	p-	-0.1794	2.5024	1.5548	317.4	209.4	92.6
39	03	-0261	Jul 11	10:44:03	13489	-27959	T-	p-	-0.2481	2.3765	1.4285	315.0	206.1	85.4
40	04	-0243	Jul 21	18:19:53	13258	-27736	T	p-	-0.3126	2.2585	1.3098	312.2	202.0	75.6
41	05	-0225	Aug 02	02:01:59	13031	-27513	T	p-	-0.3721	2.1499	1.1998	309.2	197.4	62.9

42	06	-0207 Aug 12	09:51:43	12810	-27290	T	-a	-0.4257	2.0525	1.1007	306.1	192.4	46.0
43	07	-0189 Aug 23	17:49:16	12592	-27067	T	-a	-0.4730	1.9669	1.0130	303.1	187.5	16.9
44	08	-0171 Sep 03	01:54:23	12379	-26844	P	-a	-0.5141	1.8925	0.9362	300.3	182.6	-
45	09	-0153 Sep 14	10:08:20	12169	-26621	P	-a	-0.5483	1.8311	0.8722	297.9	178.1	-
46	10	-0135 Sep 24	18:30:13	11964	-26398	P	-a	-0.5762	1.7812	0.8197	295.8	174.2	-
47	11	-0117 Oct 06	02:59:37	11762	-26175	P	-a	-0.5979	1.7428	0.7787	294.2	170.9	-
48	12	-0099 Oct 16	11:36:14	11563	-25952	P	-a	-0.6138	1.7149	0.7483	293.0	168.4	-
49	13	-0081 Oct 27	20:19:10	11368	-25729	P	-a	-0.6242	1.6969	0.7280	292.3	166.6	-
50	14	-0063 Nov 07	05:07:05	11176	-25506	P	-a	-0.6307	1.6858	0.7151	292.0	165.5	-
51	15	-0045 Nov 18	13:57:39	10987	-25283	P	-a	-0.6351	1.6785	0.7063	291.9	164.8	-
52	16	-0027 Nov 28	22:50:38	10800	-25060	P	-a	-0.6374	1.6749	0.7017	292.0	164.5	-
53	17	-0009 Dec 10	07:44:05	10616	-24837	P	-a	-0.6388	1.6726	0.6987	292.1	164.3	-
54	18	0009 Dec 20	16:35:45	10434	-24614	P	-a	-0.6419	1.6670	0.6930	292.1	164.0	-
55	19	0028 Jan 01	01:24:22	10254	-24391	P	-a	-0.6472	1.6572	0.6833	291.9	163.2	-
56	20	0046 Jan 11	10:08:27	10076	-24168	P	-a	-0.6563	1.6402	0.6670	291.3	161.9	-
57	21	0064 Jan 22	18:47:36	9900	-23945	P	-a	-0.6692	1.6161	0.6437	290.3	159.9	-
58	22	0082 Feb 02	03:18:35	9725	-23722	P	-a	-0.6886	1.5799	0.6087	288.7	156.6	-
59	23	0100 Feb 13	11:43:02	9551	-23499	P	-a	-0.7131	1.5343	0.5642	286.4	152.1	-
60	24	0118 Feb 23	19:58:14	9379	-23276	P	-a	-0.7452	1.4748	0.5060	283.3	145.6	-
61	25	0136 Mar 06	04:05:42	9207	-23053	P	-a	-0.7833	1.4044	0.4367	279.2	137.0	-
62	26	0154 Mar 17	12:03:13	9035	-22830	P	-a	-0.8293	1.3194	0.3526	273.8	124.9	-
63	27	0172 Mar 27	19:53:27	8864	-22607	P	-a	-0.8808	1.2247	0.2584	267.2	108.6	-
64	28	0190 Apr 08	03:34:57	8693	-22384	P	-a	-0.9390	1.1178	0.1517	259.0	84.7	-
65	29	0208 Apr 18	11:08:28	8522	-22161	P	-a	-1.0031	1.0003	0.0340	248.8	40.8	-
66	30	0226 Apr 29	18:35:22	8351	-21938	N	-a	-1.0721	0.8742	-0.0929	236.3	-	-
67	31	0244 May 10	01:56:36	8179	-21715	N	-a	-1.1449	0.7411	-0.2273	221.3	-	-
68	32	0262 May 21	09:13:33	8007	-21492	N	-a	-1.2203	0.6037	-0.3666	203.2	-	-
69	33	0280 May 31	16:26:06	7834	-21269	N	-a	-1.2984	0.4618	-0.5110	180.8	-	-

70	34	0298	Jun 11	23:37:34	7661 -21046	N	-a	-1.3764	0.3202	-0.6557	153.2	-	-
71	35	0316	Jun 22	06:47:58	7486 -20823	N	-a	-1.4545	0.1788	-0.8010	116.4	-	-
72	36	0334	Jul 03	13:58:40	7311 -20600	Ne	-a	-1.5312	0.0402	-0.9439	56.1	-	-

SAROS SERIES

55

Saros series 55 contains 72 lunar eclipses.

													PHASE
													DURATIONS
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-37	-0935	Apr 25	03:12:37	24155 -36298	Nb	a-	-1.5053	0.0681	-0.8771	69.5	-	-
02	-36	-0917	May 06	10:39:22	23839 -36075	N	a-	-1.4345	0.1969	-0.7461	116.6	-	-
03	-35	-0899	May 16	18:03:46	23526 -35852	N	a-	-1.3616	0.3298	-0.6115	148.9	-	-
04	-34	-0881	May 28	01:27:49	23214 -35629	N	a-	-1.2880	0.4645	-0.4760	174.3	-	-
05	-33	-0863	Jun 07	08:51:28	22905 -35406	N	a-	-1.2139	0.6003	-0.3399	195.4	-	-
06	-32	-0845	Jun 18	16:18:02	22598 -35183	N	a-	-1.1420	0.7325	-0.2083	212.9	-	-

07	-31	-0827	Jun 28	23:47:13	22293	-34960	N	a-	-1.0725	0.8606	-0.0813	227.7	-	-
08	-30	-0809	Jul 10	07:20:32	21990	-34737	P	a-	-1.0064	0.9828	0.0391	240.3	42.9	-
09	-29	-0791	Jul 20	14:59:07	21689	-34514	P	a-	-0.9447	1.0973	0.1513	251.0	83.0	-
10	-28	-0773	Jul 31	22:44:28	21390	-34291	P	a-	-0.8886	1.2015	0.2527	259.8	105.8	-
11	-27	-0755	Aug 11	06:36:35	21093	-34068	P	a-	-0.8384	1.2952	0.3433	267.2	121.7	-
12	-26	-0737	Aug 22	14:35:40	20798	-33845	P	a-	-0.7942	1.3783	0.4227	273.4	133.5	-
13	-25	-0719	Sep 01	22:43:06	20506	-33622	P	a-	-0.7572	1.4480	0.4886	278.4	142.2	-
14	-24	-0701	Sep 13	06:58:30	20215	-33399	P	a-	-0.7271	1.5053	0.5420	282.5	148.7	-
15	-23	-0683	Sep 23	15:21:32	19926	-33176	P	a-	-0.7035	1.5506	0.5834	285.7	153.4	-
16	-22	-0665	Oct 04	23:51:57	19640	-32953	P	a-	-0.6863	1.5840	0.6130	288.2	156.6	-
17	-21	-0647	Oct 15	08:28:55	19356	-32730	P	a-	-0.6749	1.6067	0.6321	290.0	158.8	-
18	-20	-0629	Oct 26	17:11:40	19073	-32507	P	a-	-0.6688	1.6196	0.6417	291.4	159.9	-
19	-19	-0611	Nov 06	01:57:22	18793	-32284	P	a-	-0.6656	1.6270	0.6462	292.4	160.6	-
20	-18	-0593	Nov 17	10:47:01	18515	-32061	P	a-	-0.6660	1.6274	0.6442	293.1	160.6	-
21	-17	-0575	Nov 27	19:36:50	18239	-31838	P	a-	-0.6668	1.6270	0.6417	293.7	160.6	-
22	-16	-0557	Dec 09	04:26:52	17965	-31615	P	a-	-0.6685	1.6246	0.6378	294.2	160.5	-
23	-15	-0539	Dec 19	13:13:01	17693	-31392	P	a-	-0.6674	1.6272	0.6394	295.0	161.0	-
24	-14	-0521	Dec 30	21:56:48	17423	-31169	P	a-	-0.6649	1.6320	0.6436	296.0	161.8	-
25	-13	-0502	Jan 10	06:34:14	17155	-30946	P	a-	-0.6574	1.6459	0.6573	297.4	163.5	-
26	-12	-0484	Jan 21	15:05:25	16840	-30723	P	a-	-0.6454	1.6679	0.6793	299.3	166.0	-
27	-11	-0466	Jan 31	23:27:57	16528	-30500	P	a-	-0.6267	1.7021	0.7138	301.8	169.6	-
28	-10	-0448	Feb 12	07:42:47	16225	-30277	P	a-	-0.6022	1.7468	0.7589	304.8	174.0	-
29	-09	-0430	Feb 22	15:48:02	15931	-30054	P	a-	-0.5703	1.8052	0.8176	308.4	179.3	-
30	-08	-0412	Mar 04	23:43:55	15643	-29831	P	a-	-0.5312	1.8768	0.8895	312.4	185.3	-
31	-07	-0394	Mar 16	07:30:08	15364	-29608	P	a-	-0.4847	1.9621	0.9748	316.8	191.6	-
32	-06	-0376	Mar 26	15:07:40	15091	-29385	T	p-	-0.4319	2.0593	1.0716	321.3	197.9	40.4
33	-05	-0358	Apr 06	22:35:36	14825	-29162	T	p-	-0.3718	2.1698	1.1815	325.9	204.1	62.4
34	-04	-0340	Apr 17	05:56:21	14565	-28939	T	p-	-0.3064	2.2903	1.3010	330.3	209.8	77.4

35	-03	-0322	Apr 28	13:09:23	14310	-28716	T-	pp	-0.2357	2.4208	1.4299	334.3	214.7	88.4
36	-02	-0304	May 08	20:17:51	14062	-28493	T-	pp	-0.1620	2.5573	1.5642	337.7	218.6	96.2
37	-01	-0286	May 20	03:19:29	13819	-28270	T-	pp	-0.0836	2.7024	1.7066	340.5	221.4	101.1
38	00	-0268	May 30	10:19:37	13581	-28047	T-	pp	-0.0051	2.8481	1.8490	342.6	222.8	102.9
39	01	-0250	Jun 10	17:16:05	13348	-27824	T+	pp	0.0752	2.7214	1.7184	343.8	222.9	101.8
40	02	-0232	Jun 21	00:13:34	13120	-27601	T+	pp	0.1540	2.5790	1.5717	344.2	221.5	97.5
41	03	-0214	Jul 02	07:09:55	12897	-27378	T+	-p	0.2326	2.4373	1.4251	343.8	218.8	89.5
42	04	-0196	Jul 12	14:10:33	12677	-27155	T	-a	0.3066	2.3042	1.2866	342.6	214.7	77.6
43	05	-0178	Jul 23	21:13:32	12463	-26932	T	-a	0.3774	2.1772	1.1538	340.9	209.5	59.6
44	06	-0160	Aug 03	04:21:58	12252	-26709	T	-a	0.4426	2.0606	1.0311	338.7	203.4	27.9
45	07	-0142	Aug 14	11:35:38	12045	-26486	P	-a	0.5027	1.9536	0.9178	336.2	196.5	-
46	08	-0124	Aug 24	18:56:49	11841	-26263	P	-a	0.5556	1.8598	0.8176	333.7	189.4	-
47	09	-0106	Sep 05	02:24:51	11641	-26040	P	-h	0.6017	1.7785	0.7297	331.3	182.2	-
48	10	-0088	Sep 15	09:59:46	11445	-25817	P	-h	0.6412	1.7093	0.6542	329.1	175.2	-
49	11	-0070	Sep 26	17:42:43	11251	-25594	P	-h	0.6730	1.6540	0.5926	327.4	168.9	-
50	12	-0052	Oct 07	01:32:43	11061	-25371	P	-h	0.6983	1.6105	0.5433	326.1	163.4	-
51	13	-0034	Oct 18	09:29:26	10873	-25148	P	-h	0.7173	1.5784	0.5058	325.4	159.0	-
52	14	-0016	Oct 28	17:31:20	10688	-24925	P	-h	0.7313	1.5551	0.4777	325.1	155.6	-
53	15	0002	Nov 09	01:38:13	10505	-24702	P	-h	0.7405	1.5403	0.4587	325.2	153.3	-
54	16	0020	Nov 19	09:47:34	10325	-24479	P	-h	0.7471	1.5300	0.4448	325.5	151.6	-
55	17	0038	Nov 30	17:57:58	10146	-24256	P	-h	0.7523	1.5219	0.4340	325.9	150.3	-
56	18	0056	Dec 11	02:08:06	9969	-24033	P	-t	0.7573	1.5137	0.4239	326.1	149.1	-
57	19	0074	Dec 22	10:16:17	9794	-23810	P	-t	0.7635	1.5029	0.4119	326.1	147.5	-
58	20	0093	Jan 01	18:19:53	9620	-23587	P	-t	0.7729	1.4858	0.3943	325.5	145.0	-
59	21	0111	Jan 13	02:17:53	9447	-23364	P	-t	0.7865	1.4607	0.3695	324.2	141.1	-
60	22	0129	Jan 23	10:08:52	9274	-23141	P	-t	0.8054	1.4256	0.3353	322.1	135.4	-
61	23	0147	Feb 03	17:52:16	9103	-22918	P	-t	0.8303	1.3793	0.2902	318.8	127.0	-
62	24	0165	Feb 14	01:25:02	8932	-22695	P	-t	0.8633	1.3179	0.2307	314.1	114.4	-

63	25	0183	Feb 25	08:49:05	8761	-22472	P	-t	0.9027	1.2445	0.1593	308.0	96.2	-
64	26	0201	Mar 07	16:02:06	8590	-22249	P	-t	0.9505	1.1556	0.0727	299.8	65.8	-
65	27	0219	Mar 18	23:06:50	8419	-22026	Nx	-t	1.0046	1.0552	-0.0254	289.7	-	-
66	28	0237	Mar 29	05:59:54	8247	-21803	N	-t	1.0676	0.9385	-0.1397	276.6	-	-
67	29	0255	Apr 09	12:46:05	8075	-21580	N	-t	1.1356	0.8126	-0.2634	260.7	-	-
68	30	0273	Apr 19	19:22:51	7903	-21357	N	-t	1.2102	0.6747	-0.3993	240.8	-	-
69	31	0291	May 01	01:54:20	7729	-21134	N	-t	1.2885	0.5300	-0.5422	216.4	-	-
70	32	0309	May 11	08:19:25	7555	-20911	N	-t	1.3715	0.3770	-0.6936	185.1	-	-
71	33	0327	May 22	14:42:20	7380	-20688	N	-t	1.4554	0.2223	-0.8471	144.1	-	-
72	34	0345	Jun 01	21:03:03	7205	-20465	Ne	-t	1.5406	0.0656	-1.0030	79.4	-	-

SAROS SERIES

56

Saros series 56 contains 72 lunar eclipses.

												PHASE		
												DURATIONS		
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														

01	-34	-0852	May 07	13:07:29	22719	-35271	Nb	t-	1.5204	0.0781	-0.9417	81.6	-	-
02	-33	-0834	May 18	19:53:46	22413	-35048	N	t-	1.4473	0.2137	-0.8090	133.8	-	-
03	-32	-0816	May 29	02:37:11	22109	-34825	N	t-	1.3723	0.3529	-0.6731	170.5	-	-
04	-31	-0798	Jun 09	09:19:29	21807	-34602	N	t-	1.2970	0.4931	-0.5369	199.7	-	-
05	-30	-0780	Jun 19	16:00:40	21508	-34379	N	t-	1.2213	0.6343	-0.4000	224.4	-	-
06	-29	-0762	Jun 30	22:44:30	21210	-34156	N	t-	1.1479	0.7713	-0.2679	245.2	-	-
07	-28	-0744	Jul 11	05:30:51	20914	-33933	N	t-	1.0767	0.9046	-0.1398	263.0	-	-
08	-27	-0726	Jul 22	12:22:13	20621	-33710	Nx	t-	1.0101	1.0296	-0.0202	278.2	-	-
09	-26	-0708	Aug 01	19:18:03	20329	-33487	P	t-	0.9474	1.1475	0.0919	291.2	72.4	-
10	-25	-0690	Aug 13	02:21:49	20040	-33264	P	t-	0.8915	1.2531	0.1916	302.0	103.3	-
11	-24	-0672	Aug 23	09:32:19	19753	-33041	P	t-	0.8414	1.3481	0.2807	311.2	123.8	-
12	-23	-0654	Sep 03	16:50:41	19468	-32818	P	t-	0.7979	1.4308	0.3575	318.8	138.4	-
13	-22	-0636	Sep 14	00:16:57	19184	-32595	P	t-	0.7613	1.5009	0.4219	325.0	149.1	-
14	-21	-0618	Sep 25	07:52:18	18903	-32372	P	t-	0.7328	1.5559	0.4716	329.9	156.7	-
15	-20	-0600	Oct 05	15:34:51	18624	-32149	P	t-	0.7102	1.5998	0.5106	333.8	162.4	-
16	-19	-0582	Oct 16	23:24:02	18347	-31926	P	t-	0.6935	1.6326	0.5391	336.9	166.3	-
17	-18	-0564	Oct 27	07:18:49	18072	-31703	P	t-	0.6817	1.6562	0.5590	339.2	169.1	-
18	-17	-0546	Nov 07	15:18:48	17800	-31480	P	t-	0.6744	1.6710	0.5708	340.8	170.7	-
19	-16	-0528	Nov 17	23:20:21	17529	-31257	P	t-	0.6689	1.6822	0.5798	342.1	172.0	-
20	-15	-0510	Nov 29	07:24:10	17260	-31034	P	t-	0.6655	1.6891	0.5854	343.0	172.9	-
21	-14	-0492	Dec 09	15:26:16	16966	-30811	P	t-	0.6610	1.6977	0.5935	343.8	174.0	-
22	-13	-0474	Dec 20	23:27:14	16650	-30588	P	t-	0.6555	1.7075	0.6036	344.6	175.3	-
23	-12	-0456	Dec 31	07:21:55	16344	-30365	P	t-	0.6452	1.7259	0.6231	345.8	177.6	-
24	-11	-0437	Jan 11	15:12:59	16046	-30142	P	t-	0.6319	1.7495	0.6485	347.2	180.5	-
25	-10	-0419	Jan 21	22:55:20	15756	-29919	P	t-	0.6120	1.7847	0.6860	349.0	184.6	-
26	-09	-0401	Feb 02	06:30:34	15473	-29696	P	t-	0.5860	1.8309	0.7352	351.2	189.5	-
27	-08	-0383	Feb 12	13:55:19	15198	-29473	P	t-	0.5515	1.8925	0.8002	354.0	195.5	-

28 -07 -0365 Feb 23 21:12:36 14929 -29250 P t- 0.5109 1.9653 0.8766 357.0 201.8 -

29 -06 -0347 Mar 06 04:19:28 14667 -29027 P t- 0.4616 2.0537 0.9688 360.2 208.6 -

30 -05 -0329 Mar 17 11:17:24 14410 -28804 T t- 0.4050 2.1556 1.0747 363.4 215.2 44.3

31 -04 -0311 Mar 27 18:06:29 14159 -28581 T t- 0.3410 2.2711 1.1941 366.3 221.4 68.6

32 -03 -0293 Apr 08 00:48:33 13914 -28358 T+ pp 0.2707 2.3982 1.3249 368.9 226.7 84.7

33 -02 -0275 Apr 18 07:23:53 13674 -28135 T+ pp 0.1947 2.5359 1.4661 370.7 230.9 95.8

34 -01 -0257 Apr 29 13:54:02 13440 -27912 T+ pp 0.1141 2.6821 1.6157 371.7 233.7 102.9

35 00 -0239 May 09 20:20:54 13210 -27689 T+ pp 0.0301 2.8347 1.7713 371.7 234.9 106.1

36 01 -0221 May 21 02:46:14 12984 -27466 T- pp -0.0557 2.7865 1.7256 370.7 234.3 105.5

37 02 -0203 May 31 09:09:57 12763 -27243 T- pp -0.1435 2.6243 1.5656 368.4 231.9 100.7

38 03 -0185 Jun 11 15:35:58 12547 -27020 T- pp -0.2299 2.4647 1.4078 365.0 227.6 91.3

39 04 -0167 Jun 21 22:04:14 12334 -26797 T pp -0.3154 2.3071 1.2517 360.6 221.5 76.0

40 05 -0149 Jul 03 04:38:27 12126 -26574 T -t -0.3966 2.1577 1.1032 355.2 213.8 51.0

41 06 -0131 Jul 13 11:16:53 11921 -26351 P -t -0.4751 2.0134 0.9595 349.0 204.4 -

42 07 -0113 Jul 24 18:04:26 11720 -26128 P -t -0.5468 1.8816 0.8280 342.4 193.9 -

43 08 -0095 Aug 04 00:59:20 11522 -25905 P -t -0.6134 1.7594 0.7057 335.4 182.4 -

44 09 -0077 Aug 15 08:04:21 11327 -25682 P -t -0.6722 1.6516 0.5978 328.4 170.4 -

45 10 -0059 Aug 25 15:18:07 11136 -25459 P -t -0.7246 1.5557 0.5015 321.6 158.1 -

46 11 -0041 Sep 05 22:43:31 10947 -25236 P -t -0.7683 1.4758 0.4212 315.3 146.3 -

47 12 -0023 Sep 16 06:18:50 10761 -25013 P -t -0.8046 1.4093 0.3543 309.6 135.2 -

48 13 -0005 Sep 27 14:04:02 10577 -24790 P -t -0.8337 1.3561 0.3009 304.7 125.2 -

49 14 0013 Oct 07 21:59:19 10396 -24567 P -t -0.8553 1.3164 0.2612 300.7 117.0 -

50 15 0031 Oct 19 06:03:52 10216 -24344 P -t -0.8698 1.2896 0.2349 297.6 111.1 -

51 16 0049 Oct 29 14:16:32 10039 -24121 P -h -0.8788 1.2725 0.2186 295.3 107.1 -

52 17 0067 Nov 09 22:34:28 9863 -23898 P -h -0.8844 1.2617 0.2092 293.4 104.6 -

53 18 0085 Nov 20 06:58:27 9688 -23675 P -h -0.8858 1.2580 0.2075 292.1 103.9 -

54 19 0103 Dec 01 15:25:15 9515 -23452 P -h -0.8856 1.2570 0.2091 291.0 104.0 -

55 20 0121 Dec 11 23:53:41 9342 -23229 P -h -0.8849 1.2567 0.2121 289.9 104.4 -

56	21	0139	Dec 23	08:21:15	9170	-23006	P	-a	-0.8854	1.2538	0.2130	288.5	104.3	-
57	22	0158	Jan 02	16:47:31	8999	-22783	P	-a	-0.8879	1.2470	0.2107	286.7	103.4	-
58	23	0176	Jan 14	01:09:46	8828	-22560	P	-a	-0.8943	1.2327	0.2016	284.3	101.0	-
59	24	0194	Jan 24	09:26:58	8657	-22337	P	-a	-0.9053	1.2096	0.1840	281.2	96.5	-
60	25	0212	Feb 04	17:38:20	8486	-22114	P	-a	-0.9219	1.1763	0.1566	277.0	89.1	-
61	26	0230	Feb 15	01:43:28	8315	-21891	P	-a	-0.9438	1.1329	0.1193	271.9	77.9	-
62	27	0248	Feb 26	09:40:27	8143	-21668	P	-a	-0.9733	1.0757	0.0684	265.4	59.3	-
63	28	0266	Mar 08	17:30:47	7971	-21445	P	-a	-1.0088	1.0073	0.0063	257.5	18.1	-
64	29	0284	Mar 19	01:13:41	7798	-21222	N	-a	-1.0511	0.9265	-0.0682	248.0	-	-
65	30	0302	Mar 30	08:50:58	7624	-20999	N	-a	-1.0986	0.8363	-0.1524	236.8	-	-
66	31	0320	Apr 09	16:20:28	7449	-20776	N	-a	-1.1532	0.7333	-0.2497	223.1	-	-
67	32	0338	Apr 20	23:46:47	7274	-20553	N	-a	-1.2110	0.6245	-0.3532	207.2	-	-
68	33	0356	May 01	07:07:42	7098	-20330	N	-a	-1.2742	0.5061	-0.4667	188.0	-	-
69	34	0374	May 12	14:27:24	6921	-20107	N	-a	-1.3388	0.3854	-0.5831	165.3	-	-
70	35	0392	May 22	21:43:32	6743	-19884	N	-a	-1.4069	0.2586	-0.7062	136.5	-	-
71	36	0410	Jun 03	05:01:28	6565	-19661	N	-a	-1.4742	0.1336	-0.8282	98.9	-	-
72	37	0428	Jun 13	12:18:43	6387	-19438	Ne	-a	-1.5427	0.0066	-0.9526	22.2	-	-

SAROS SERIES

57

Saros series 57 contains 73 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-35	-0823 Apr 16	20:28:26	22229	-34913	Nb t-	-1.5586	0.0252	-1.0287	48.4	-	-		
02	-34	-0805 Apr 28	03:05:52	21926	-34690	N t-	-1.4784	0.1702	-0.8793	123.6	-	-		
03	-33	-0787 May 08	09:39:44	21626	-34467	N t-	-1.3943	0.3225	-0.7230	167.1	-	-		
04	-32	-0769 May 19	16:13:44	21327	-34244	N t-	-1.3088	0.4775	-0.5643	199.7	-	-		
05	-31	-0751 May 29	22:47:48	21031	-34021	N t-	-1.2218	0.6354	-0.4032	226.1	-	-		
06	-30	-0733 Jun 10	05:25:27	20736	-33798	N t-	-1.1364	0.7909	-0.2450	247.4	-	-		
07	-29	-0715 Jun 20	12:07:09	20444	-33575	N t-	-1.0530	0.9428	-0.0909	265.0	-	-		
08	-28	-0697 Jul 01	18:53:48	20154	-33352	P t-	-0.9722	1.0901	0.0581	279.5	57.0	-		
09	-27	-0679 Jul 12	01:48:08	19866	-33129	P t-	-0.8966	1.2283	0.1976	291.2	102.6	-		
10	-26	-0661 Jul 23	08:49:45	19580	-32906	P h-	-0.8258	1.3576	0.3279	300.7	129.3	-		
11	-25	-0643 Aug 02	16:01:09	19296	-32683	P h-	-0.7618	1.4748	0.4456	308.1	147.6	-		
12	-24	-0625 Aug 13	23:20:50	19014	-32460	P h-	-0.7037	1.5812	0.5524	313.9	161.0	-		
13	-23	-0607 Aug 24	06:52:12	18734	-32237	P a-	-0.6543	1.6717	0.6431	318.2	170.6	-		
14	-22	-0589 Sep 04	14:32:47	18456	-32014	P a-	-0.6118	1.7498	0.7212	321.3	177.8	-		
15	-21	-0571 Sep 14	22:24:32	18181	-31791	P a-	-0.5775	1.8126	0.7841	323.4	182.8	-		
16	-20	-0553 Sep 26	06:25:23	17907	-31568	P a-	-0.5500	1.8630	0.8346	324.7	186.4	-		
17	-19	-0535 Oct 06	14:36:48	17636	-31345	P a-	-0.5302	1.8992	0.8713	325.3	188.6	-		
18	-18	-0517 Oct 17	22:55:30	17366	-31122	P a-	-0.5160	1.9248	0.8977	325.3	190.0	-		
19	-17	-0499 Oct 28	07:21:33	17093	-30899	P a-	-0.5069	1.9409	0.9149	324.9	190.6	-		
20	-16	-0481 Nov 08	15:53:00	16774	-30676	P a-	-0.5015	1.9500	0.9256	324.1	190.8	-		

21	-15	-0463	Nov 19	00:29:39	16464	-30453	P	a-	-0.4994	1.9529	0.9307	323.1	190.6	-
22	-14	-0445	Nov 30	09:07:28	16163	-30230	P	a-	-0.4976	1.9548	0.9353	322.0	190.4	-
23	-13	-0427	Dec 10	17:46:32	15869	-30007	P	a-	-0.4960	1.9560	0.9399	320.9	190.2	-
24	-12	-0409	Dec 22	02:23:37	15584	-29784	P	a-	-0.4921	1.9612	0.9490	319.9	190.3	-
25	-11	-0390	Jan 01	10:59:28	15306	-29561	P	a-	-0.4863	1.9696	0.9617	319.0	190.7	-
26	-10	-0372	Jan 12	19:29:05	15034	-29338	P	a-	-0.4747	1.9885	0.9856	318.4	191.7	-
27	-09	-0354	Jan 23	03:55:05	14769	-29115	T	a-	-0.4593	2.0140	1.0163	318.1	193.1	19.4
28	-08	-0336	Feb 03	12:13:02	14511	-28892	T	a-	-0.4366	2.0529	1.0606	318.2	195.2	36.9
29	-07	-0318	Feb 13	20:25:32	14258	-28669	T	a-	-0.4089	2.1009	1.1142	318.5	197.6	49.7
30	-06	-0300	Feb 25	04:28:32	14010	-28446	T	a-	-0.3726	2.1647	1.1837	319.1	200.6	61.6
31	-05	-0282	Mar 07	12:26:14	13768	-28223	T	p-	-0.3312	2.2378	1.2624	319.8	203.5	71.6
32	-04	-0264	Mar 17	20:15:16	13532	-28000	T	p-	-0.2819	2.3256	1.3555	320.6	206.5	80.6
33	-03	-0246	Mar 29	03:58:25	13300	-27777	T-	p-	-0.2270	2.4237	1.4588	321.3	209.1	88.1
34	-02	-0228	Apr 08	11:34:41	13073	-27554	T-	p-	-0.1658	2.5336	1.5733	321.8	211.3	93.9
35	-01	-0210	Apr 19	19:07:03	12850	-27331	T-	pp	-0.1008	2.6509	1.6948	321.9	212.8	97.8
36	00	-0192	Apr 30	02:35:01	12632	-27108	T-	pp	-0.0313	2.7766	1.8241	321.5	213.4	99.8
37	01	-0174	May 11	09:59:53	12418	-26885	T+	pp	0.0414	2.7565	1.8071	320.6	213.1	99.6
38	02	-0156	May 21	17:23:21	12208	-26662	T+	pp	0.1157	2.6190	1.6719	319.0	211.6	97.0
39	03	-0138	Jun 02	00:46:22	12001	-26439	T+	-p	0.1907	2.4804	1.5351	316.8	209.0	91.7
40	04	-0120	Jun 12	08:10:00	11799	-26216	T+	-p	0.2655	2.3426	1.3984	314.0	205.2	83.3
41	05	-0102	Jun 23	15:35:33	11600	-25993	T	-p	0.3391	2.2073	1.2635	310.5	200.3	70.9
42	06	-0084	Jul 03	23:04:37	11404	-25770	T	-a	0.4099	2.0775	1.1335	306.5	194.3	52.6
43	07	-0066	Jul 15	06:38:24	11211	-25547	T	-a	0.4767	1.9554	1.0105	302.2	187.5	15.3
44	08	-0048	Jul 25	14:16:35	11021	-25324	P	-a	0.5399	1.8403	0.8939	297.6	179.9	-
45	09	-0030	Aug 05	22:01:46	10834	-25101	P	-a	0.5972	1.7361	0.7878	293.0	171.9	-
46	10	-0012	Aug 16	05:53:14	10649	-24878	P	-a	0.6492	1.6418	0.6911	288.4	163.5	-
47	11	0006	Aug 27	13:53:00	10467	-24655	P	-a	0.6944	1.5603	0.6069	284.1	155.3	-
48	12	0024	Sep 06	21:59:30	10287	-24432	P	-a	0.7339	1.4893	0.5329	280.1	147.2	-

49	13	0042	Sep 18	06:15:02	10109	-24209	P	-a	0.7659	1.4322	0.4727	276.8	139.9	-
50	14	0060	Sep 28	14:37:59	9932	-23986	P	-a	0.7918	1.3862	0.4235	274.1	133.4	-
51	15	0078	Oct 09	23:08:40	9757	-23763	P	-a	0.8115	1.3515	0.3859	272.0	128.1	-
52	16	0096	Oct 20	07:46:06	9583	-23540	P	-a	0.8257	1.3270	0.3583	270.6	124.0	-
53	17	0114	Oct 31	16:29:23	9410	-23317	P	-a	0.8354	1.3105	0.3393	269.8	121.1	-
54	18	0132	Nov 11	01:17:25	9238	-23094	P	-a	0.8409	1.3016	0.3280	269.5	119.4	-
55	19	0150	Nov 22	10:07:33	9067	-22871	P	-a	0.8449	1.2952	0.3198	269.4	118.1	-
56	20	0168	Dec 02	19:00:20	8896	-22648	P	-a	0.8466	1.2928	0.3159	269.6	117.6	-
57	21	0186	Dec 14	03:52:26	8725	-22425	P	-a	0.8493	1.2884	0.3105	269.7	116.8	-
58	22	0204	Dec 24	12:43:10	8554	-22202	P	-a	0.8527	1.2824	0.3040	269.7	115.8	-
59	23	0223	Jan 04	21:29:18	8382	-21979	P	-a	0.8598	1.2695	0.2909	269.1	113.7	-
60	24	0241	Jan 15	06:11:26	8211	-21756	P	-a	0.8699	1.2507	0.2724	268.1	110.5	-
61	25	0259	Jan 26	14:46:56	8039	-21533	P	-a	0.8855	1.2219	0.2441	266.3	105.2	-
62	26	0277	Feb 05	23:15:03	7866	-21310	P	-a	0.9069	1.1823	0.2052	263.6	97.2	-
63	27	0295	Feb 17	07:34:50	7693	-21087	P	-a	0.9350	1.1304	0.1541	259.7	85.0	-
64	28	0313	Feb 27	15:46:26	7518	-20864	P	-a	0.9693	1.0669	0.0914	254.6	66.2	-
65	29	0331	Mar 10	23:48:46	7343	-20641	P	-a	1.0110	0.9902	0.0154	247.8	27.5	-
66	30	0349	Mar 21	07:42:07	7167	-20418	N	-a	1.0597	0.9005	-0.0739	239.2	-	-
67	31	0367	Apr 01	15:26:47	6991	-20195	N	-a	1.1151	0.7989	-0.1753	228.3	-	-
68	32	0385	Apr 11	23:03:56	6813	-19972	N	-a	1.1760	0.6872	-0.2872	214.7	-	-
69	33	0403	Apr 23	06:32:23	6635	-19749	N	-a	1.2433	0.5640	-0.4110	197.5	-	-
70	34	0421	May 03	13:55:13	6457	-19526	N	-a	1.3143	0.4343	-0.5420	176.1	-	-
71	35	0439	May 14	21:11:34	6278	-19303	N	-a	1.3895	0.2972	-0.6808	148.1	-	-
72	36	0457	May 25	04:24:55	6100	-19080	N	-a	1.4663	0.1575	-0.8229	109.6	-	-
73	37	0475	Jun 05	11:32:25	5923	-18857	Ne	-a	1.5465	0.0118	-0.9715	30.5	-	-

SAROS SERIES

58

Saros series 58 contains 73 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-38	-0812 Mar 16	16:31:39	22045	-34778	Nb a-	1.5330	0.0218	-0.9321	39.6	-	-		
02	-37	-0794 Mar 28	00:16:46	21744	-34555	N a-	1.4784	0.1201	-0.8301	91.9	-	-		
03	-36	-0776 Apr 07	07:56:37	21445	-34332	N a-	1.4192	0.2270	-0.7199	124.9	-	-		
04	-35	-0758 Apr 18	15:31:17	21147	-34109	N a-	1.3556	0.3423	-0.6018	151.5	-	-		
05	-34	-0740 Apr 28	23:00:56	20852	-33886	N a-	1.2875	0.4661	-0.4758	174.6	-	-		
06	-33	-0722 May 10	06:28:12	20559	-33663	N a-	1.2172	0.5944	-0.3460	194.5	-	-		
07	-32	-0704 May 20	13:53:20	20268	-33440	N a-	1.1446	0.7272	-0.2124	212.2	-	-		
08	-31	-0686 May 31	21:18:32	19979	-33217	N a-	1.0720	0.8602	-0.0791	227.6	-	-		
09	-30	-0668 Jun 11	04:43:12	19692	-32994	P a-	0.9988	0.9948	0.0549	241.3	50.7	-		
10	-29	-0650 Jun 22	12:11:03	19408	-32771	P a-	0.9282	1.1251	0.1841	253.1	91.1	-		
11	-28	-0632 Jul 02	19:41:31	19125	-32548	P a-	0.8594	1.2522	0.3092	263.5	116.1	-		
12	-27	-0614 Jul 14	03:15:51	18844	-32325	P a-	0.7941	1.3732	0.4278	272.4	134.3	-		
13	-26	-0596 Jul 24	10:55:13	18566	-32102	P a-	0.7332	1.4866	0.5382	280.1	148.2	-		

14	-25	-0578	Aug 04	18:40:50	18289	-31879	P	a-	0.6777	1.5901	0.6382	286.5	159.0	-
15	-24	-0560	Aug 15	02:33:41	18015	-31656	P	a-	0.6285	1.6824	0.7267	292.0	167.3	-
16	-23	-0542	Aug 26	10:32:35	17743	-31433	P	a-	0.5845	1.7652	0.8053	296.6	174.0	-
17	-22	-0524	Sep 05	18:40:22	17472	-31210	P	a-	0.5483	1.8338	0.8696	300.3	179.0	-
18	-21	-0506	Sep 17	02:55:15	17204	-30987	P	a-	0.5183	1.8910	0.9224	303.5	182.9	-
19	-20	-0488	Sep 27	11:18:29	16898	-30764	P	a-	0.4956	1.9349	0.9619	306.0	185.7	-
20	-19	-0470	Oct 08	19:47:23	16585	-30541	P	a-	0.4780	1.9694	0.9922	308.1	187.8	-
21	-18	-0452	Oct 19	04:23:53	16280	-30318	T	p-	0.4669	1.9917	1.0105	309.8	189.2	15.3
22	-17	-0434	Oct 30	13:04:33	15984	-30095	T	p-	0.4597	2.0069	1.0220	311.2	190.2	22.1
23	-16	-0416	Nov 09	21:49:34	15696	-29872	T	p-	0.4566	2.0141	1.0259	312.3	190.7	24.1
24	-15	-0398	Nov 21	06:36:25	15415	-29649	T	p-	0.4555	2.0177	1.0267	313.3	191.1	24.4
25	-14	-0380	Dec 01	15:24:54	15141	-29426	T	p-	0.4565	2.0169	1.0236	314.1	191.3	23.1
26	-13	-0362	Dec 13	00:11:24	14873	-29203	T	p-	0.4563	2.0182	1.0232	315.0	191.7	22.9
27	-12	-0344	Dec 23	08:55:26	14612	-28980	T	p-	0.4546	2.0220	1.0257	316.0	192.3	24.1
28	-11	-0325	Jan 03	17:34:37	14357	-28757	T	p-	0.4497	2.0313	1.0342	317.1	193.3	27.8
29	-10	-0307	Jan 14	02:09:02	14107	-28534	T	p-	0.4419	2.0460	1.0483	318.5	194.6	33.0
30	-09	-0289	Jan 25	10:34:31	13863	-28311	T	p-	0.4273	2.0728	1.0750	320.3	196.6	40.9
31	-08	-0271	Feb 04	18:53:04	13625	-28088	T	p-	0.4077	2.1087	1.1108	322.4	199.0	49.4
32	-07	-0253	Feb 16	03:01:19	13391	-27865	T	p-	0.3804	2.1589	1.1611	324.8	202.1	58.7
33	-06	-0235	Feb 26	11:01:52	13162	-27642	T	p-	0.3474	2.2194	1.2218	327.5	205.4	67.8
34	-05	-0217	Mar 09	18:50:25	12937	-27419	T	p-	0.3054	2.2964	1.2988	330.5	209.2	76.8
35	-04	-0199	Mar 20	02:31:27	12717	-27196	T+	p-	0.2579	2.3837	1.3859	333.5	212.8	84.9
36	-03	-0181	Mar 31	10:01:36	12502	-26973	T+	pp	0.2019	2.4866	1.4882	336.5	216.4	92.0
37	-02	-0163	Apr 10	17:24:33	12290	-26750	T+	pp	0.1409	2.5990	1.5997	339.2	219.4	97.6
38	-01	-0145	Apr 22	00:38:01	12082	-26527	T+	pp	0.0728	2.7247	1.7242	341.5	221.7	101.4
39	00	-0127	May 02	07:46:21	11878	-26304	T+	pp	0.0012	2.8569	1.8546	343.3	223.0	102.9
40	01	-0109	May 13	14:47:43	11678	-26081	T-	pp	-0.0752	2.7223	1.7175	344.4	223.1	101.8
41	02	-0091	May 23	21:44:36	11481	-25858	T-	pp	-0.1544	2.5785	1.5709	344.6	221.8	97.5

42	03	-0073	Jun 04	04:38:01	11287	-25635	T-	-p	-0.2355	2.4314	1.4205	343.9	218.9	89.3
43	04	-0055	Jun 14	11:30:00	11096	-25412	T	-a	-0.3168	2.2842	1.2693	342.3	214.3	75.8
44	05	-0037	Jun 25	18:21:42	10908	-25189	T	-h	-0.3972	2.1388	1.1195	339.7	208.1	53.2
45	06	-0019	Jul 06	01:13:43	10722	-24966	P	-h	-0.4762	1.9964	0.9721	336.2	200.0	-
46	07	-0001	Jul 17	08:09:12	10539	-24743	P	-h	-0.5514	1.8612	0.8315	332.0	190.3	-
47	08	0017	Jul 27	15:08:05	10358	-24520	P	-h	-0.6228	1.7330	0.6976	327.2	178.9	-
48	09	0035	Aug 07	22:11:37	10179	-24297	P	-h	-0.6894	1.6139	0.5725	321.9	165.9	-
49	10	0053	Aug 18	05:21:12	10002	-24074	P	-h	-0.7500	1.5057	0.4581	316.4	151.6	-
50	11	0071	Aug 29	12:38:10	9826	-23851	P	-h	-0.8036	1.4105	0.3566	311.1	136.2	-
51	12	0089	Sep 08	20:02:49	9652	-23628	P	-h	-0.8504	1.3279	0.2677	306.0	119.9	-
52	13	0107	Sep 20	03:34:19	9478	-23405	P	-h	-0.8908	1.2568	0.1906	301.3	102.6	-
53	14	0125	Sep 30	11:14:22	9306	-23182	P	-h	-0.9234	1.1999	0.1278	297.4	85.0	-
54	15	0143	Oct 11	19:01:54	9134	-22959	P	-h	-0.9491	1.1556	0.0780	294.4	67.0	-
55	16	0161	Oct 22	02:55:49	8963	-22736	P	-t	-0.9691	1.1214	0.0389	292.1	47.7	-
56	17	0179	Nov 02	10:55:05	8792	-22513	P	-t	-0.9839	1.0963	0.0094	290.5	23.6	-
57	18	0197	Nov 12	18:58:42	8621	-22290	Nx	-t	-0.9947	1.0784	-0.0122	289.5	-	-
58	19	0215	Nov 24	03:05:30	8450	-22067	Nx	-t	-1.0022	1.0661	-0.0275	289.0	-	-
59	20	0233	Dec 04	11:12:06	8279	-21844	Nx	-t	-1.0091	1.0546	-0.0410	288.4	-	-
60	21	0251	Dec 15	19:19:16	8107	-21621	Nx	-t	-1.0149	1.0446	-0.0525	287.9	-	-
61	22	0269	Dec 26	03:22:47	7934	-21398	Nx	-t	-1.0229	1.0303	-0.0673	286.8	-	-
62	23	0288	Jan 06	11:23:04	7761	-21175	Nx	-t	-1.0332	1.0113	-0.0861	285.1	-	-
63	24	0306	Jan 16	19:15:47	7587	-20952	N	-t	-1.0490	0.9817	-0.1148	282.0	-	-
64	25	0324	Jan 28	03:03:12	7413	-20729	N	-t	-1.0686	0.9450	-0.1501	278.0	-	-
65	26	0342	Feb 07	10:41:18	7237	-20506	N	-t	-1.0950	0.8957	-0.1975	272.1	-	-
66	27	0360	Feb 18	18:10:48	7060	-20283	N	-t	-1.1281	0.8338	-0.2570	264.2	-	-
67	28	0378	Mar 01	01:30:03	6883	-20060	N	-t	-1.1690	0.7574	-0.3307	253.8	-	-
68	29	0396	Mar 11	08:40:35	6706	-19837	N	-t	-1.2165	0.6686	-0.4166	240.5	-	-
69	30	0414	Mar 22	15:41:20	6527	-19614	N	-t	-1.2715	0.5664	-0.5159	223.5	-	-

70	31	0432	Apr 01	22:33:01	6349	-19391	N	-t	-1.3330	0.4520	-0.6273	201.7	-	-
71	32	0450	Apr 13	05:16:32	6171	-19168	N	-t	-1.4006	0.3265	-0.7500	173.3	-	-
72	33	0468	Apr 23	11:53:18	5993	-18945	N	-t	-1.4732	0.1919	-0.8819	134.4	-	-
73	34	0486	May 04	18:23:37	5816	-18722	Ne	-t	-1.5503	0.0493	-1.0222	68.9	-	-

SAROS SERIES

59

Saros series 59 contains 71 lunar eclipses.

PHASE													
DURATIONS													
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-34	-0711 Apr 09	10:11:53	20383 -33528	N	t-	-1.5042	0.1109	-0.9149	97.2	-	-	
02	-33	-0693 Apr 20	17:09:29	20093 -33305	N	t-	-1.4388	0.2316	-0.7957	139.4	-	-	
03	-32	-0675 Apr 30	23:59:18	19805 -33082	N	t-	-1.3679	0.3625	-0.6665	172.9	-	-	
04	-31	-0657 May 12	06:43:56	19520 -32859	N	t-	-1.2934	0.5004	-0.5309	201.3	-	-	
05	-30	-0639 May 22	13:23:51	19236 -32636	N	t-	-1.2155	0.6448	-0.3892	226.2	-	-	

06	-29	-0621	Jun 02	20:01:46	18955	-32413	N	t-	-1.1368	0.7909	-0.2464	247.9	-	-
07	-28	-0603	Jun 13	02:38:36	18675	-32190	N	t-	-1.0574	0.9383	-0.1027	267.0	-	-
08	-27	-0585	Jun 24	09:15:16	18398	-31967	P	t-	-0.9786	1.0850	0.0399	283.9	48.0	-
09	-26	-0567	Jul 04	15:54:22	18123	-31744	P	t-	-0.9025	1.2271	0.1774	298.4	99.5	-
10	-25	-0549	Jul 15	22:36:32	17850	-31521	P	t-	-0.8295	1.3634	0.3089	311.0	129.1	-
11	-24	-0531	Jul 26	05:23:45	17579	-31298	P	t-	-0.7609	1.4919	0.4322	321.7	150.3	-
12	-23	-0513	Aug 06	12:16:33	17310	-31075	P	t-	-0.6974	1.6111	0.5460	330.9	166.2	-
13	-22	-0495	Aug 16	19:17:01	17025	-30852	P	t-	-0.6405	1.7183	0.6477	338.5	178.4	-
14	-21	-0477	Aug 28	02:25:35	16708	-30629	P	t-	-0.5908	1.8122	0.7362	344.8	187.7	-
15	-20	-0459	Sep 07	09:41:36	16400	-30406	P	t-	-0.5476	1.8942	0.8129	350.0	195.0	-
16	-19	-0441	Sep 18	17:07:07	16100	-30183	P	t-	-0.5123	1.9615	0.8750	354.1	200.3	-
17	-18	-0423	Sep 29	00:40:26	15809	-29960	P	t-	-0.4836	2.0166	0.9254	357.4	204.4	-
18	-17	-0405	Oct 10	08:22:37	15525	-29737	P	t-	-0.4625	2.0575	0.9619	360.0	207.2	-
19	-16	-0387	Oct 20	16:09:54	15248	-29514	P	t-	-0.4458	2.0900	0.9908	362.0	209.3	-
20	-15	-0369	Nov 01	00:04:45	14978	-29291	T	t-	-0.4355	2.1103	1.0081	363.4	210.6	14.8
21	-14	-0351	Nov 11	08:02:50	14714	-29068	T	t-	-0.4279	2.1255	1.0210	364.5	211.6	23.8
22	-13	-0333	Nov 22	16:04:36	14457	-28845	T	t-	-0.4234	2.1344	1.0285	365.2	212.2	27.6
23	-12	-0315	Dec 03	00:06:05	14205	-28622	T	t-	-0.4189	2.1432	1.0366	365.8	212.7	31.2
24	-11	-0297	Dec 14	08:07:52	13959	-28399	T	t-	-0.4145	2.1510	1.0447	366.1	213.3	34.5
25	-10	-0279	Dec 24	16:05:58	13718	-28176	T	t-	-0.4072	2.1639	1.0586	366.6	214.2	39.3
26	-09	-0260	Jan 05	00:00:02	13482	-27953	T	t-	-0.3965	2.1827	1.0792	367.0	215.4	45.4
27	-08	-0242	Jan 15	07:47:53	13252	-27730	T	t-	-0.3804	2.2109	1.1099	367.7	217.2	53.0
28	-07	-0224	Jan 26	15:29:33	13025	-27507	T	p-	-0.3590	2.2486	1.1506	368.4	219.3	61.2
29	-06	-0206	Feb 05	23:01:45	12804	-27284	T	p-	-0.3297	2.3006	1.2062	369.4	221.9	70.3
30	-05	-0188	Feb 17	06:26:15	12586	-27061	T	p-	-0.2938	2.3644	1.2740	370.4	224.8	79.0
31	-04	-0170	Feb 27	13:41:04	12373	-26838	T-	pp	-0.2496	2.4433	1.3573	371.4	227.8	87.5
32	-03	-0152	Mar 09	20:48:37	12164	-26615	T-	pp	-0.1989	2.5342	1.4526	372.3	230.5	94.7
33	-02	-0134	Mar 21	03:45:27	11958	-26392	T-	pp	-0.1389	2.6419	1.5649	372.9	232.8	100.7

34	-01	-0116	Mar 31	10:36:25	11756	-26169	T-	pp	-0.0739	2.7590	1.6864	372.9	234.3	104.6
35	00	-0098	Apr 11	17:18:59	11558	-25946	T-	pp	-0.0016	2.8895	1.8212	372.2	234.8	106.1
36	01	-0080	Apr 21	23:57:43	11363	-25723	T+	pp	0.0744	2.7538	1.6896	370.7	233.8	104.6
37	02	-0062	May 03	06:29:39	11171	-25500	T+	pp	0.1564	2.6014	1.5409	368.1	231.3	99.5
38	03	-0044	May 13	13:00:48	10981	-25277	T+	pp	0.2398	2.4468	1.3898	364.5	226.9	89.9
39	04	-0026	May 24	19:28:54	10795	-25054	T	pt	0.3257	2.2876	1.2336	359.7	220.6	73.6
40	05	-0008	Jun 04	01:58:18	10611	-24831	T	-t	0.4111	2.1294	1.0782	353.7	212.2	44.8
41	06	0010	Jun 15	08:28:25	10429	-24608	P	-t	0.4965	1.9717	0.9226	346.6	201.7	-
42	07	0028	Jun 25	15:03:17	10249	-24385	P	-t	0.5784	1.8204	0.7731	338.5	189.1	-
43	08	0046	Jul 06	21:43:01	10071	-24162	P	-t	0.6571	1.6755	0.6295	329.7	174.3	-
44	09	0064	Jul 17	04:28:44	9895	-23939	P	-t	0.7315	1.5385	0.4935	320.2	157.3	-
45	10	0082	Jul 28	11:22:28	9720	-23716	P	-t	0.7998	1.4128	0.3684	310.4	138.2	-
46	11	0100	Aug 07	18:24:40	9547	-23493	P	-t	0.8618	1.2989	0.2548	300.6	116.5	-
47	12	0118	Aug 19	01:36:55	9374	-23270	P	-t	0.9165	1.1985	0.1545	291.1	91.8	-
48	13	0136	Aug 29	08:58:32	9202	-23047	P	-t	0.9642	1.1110	0.0669	282.1	61.0	-
49	14	0154	Sep 09	16:31:39	9031	-22824	Nx	-t	1.0034	1.0391	-0.0052	274.0	-	-
50	15	0172	Sep 20	00:14:49	8860	-22601	N	-t	1.0351	0.9810	-0.0633	267.1	-	-
51	16	0190	Oct 01	08:08:00	8689	-22378	N	-h	1.0594	0.9363	-0.1080	261.4	-	-
52	17	0208	Oct 11	16:10:24	8518	-22155	N	-h	1.0771	0.9037	-0.1403	256.8	-	-
53	18	0226	Oct 23	00:21:58	8346	-21932	N	-h	1.0884	0.8828	-0.1606	253.6	-	-
54	19	0244	Nov 02	08:40:26	8175	-21709	N	-h	1.0945	0.8709	-0.1714	251.3	-	-
55	20	0262	Nov 13	17:04:33	8003	-21486	N	-a	1.0970	0.8656	-0.1751	249.9	-	-
56	21	0280	Nov 24	01:33:04	7830	-21263	N	-a	1.0967	0.8650	-0.1735	248.9	-	-
57	22	0298	Dec 05	10:05:11	7656	-21040	N	-a	1.0946	0.8675	-0.1683	248.3	-	-
58	23	0316	Dec 15	18:37:07	7482	-20817	N	-a	1.0934	0.8679	-0.1644	247.5	-	-
59	24	0334	Dec 27	03:09:05	7306	-20594	N	-a	1.0930	0.8668	-0.1616	246.4	-	-
60	25	0353	Jan 06	11:37:48	7130	-20371	N	-a	1.0961	0.8586	-0.1652	244.4	-	-
61	26	0371	Jan 17	20:04:09	6953	-20148	N	-a	1.1020	0.8454	-0.1734	241.9	-	-

SAROS SERIES

60

PHASE

DURATIONS

GREATEST

ECLIPSE

01	-36	-0700	Mar 08	09:55:49	20207	-33393	Nb	t-	1.5726	0.0056	-1.0603	22.9	-	-
02	-35	-0682	Mar 19	16:58:18	19919	-33170	N	t-	1.5137	0.1108	-0.9494	100.6	-	-
03	-34	-0664	Mar 29	23:53:46	19632	-32947	N	t-	1.4481	0.2283	-0.8262	142.4	-	-
04	-33	-0646	Apr 10	06:44:20	19348	-32724	N	t-	1.3774	0.3553	-0.6939	174.9	-	-
05	-32	-0628	Apr 20	13:28:34	19066	-32501	N	t-	1.3005	0.4938	-0.5502	202.7	-	-
06	-31	-0610	May 01	20:11:15	18785	-32278	N	t-	1.2210	0.6374	-0.4020	226.2	-	-
07	-30	-0592	May 12	02:50:56	18507	-32055	N	t-	1.1376	0.7883	-0.2468	246.8	-	-
08	-29	-0574	May 23	09:31:34	18231	-31832	N	t-	1.0537	0.9402	-0.0910	264.2	-	-
09	-28	-0556	Jun 02	16:11:56	17957	-31609	P	t-	0.9684	1.0951	0.0672	279.4	61.1	-
10	-27	-0538	Jun 13	22:57:11	17685	-31386	P	t-	0.8855	1.2457	0.2207	291.9	108.0	-
11	-26	-0520	Jun 24	05:45:32	17416	-31163	P	t-	0.8039	1.3943	0.3716	302.5	136.6	-
12	-25	-0502	Jul 05	12:39:56	17148	-30940	P	h-	0.7258	1.5367	0.5159	311.1	156.8	-
13	-24	-0484	Jul 15	19:40:47	16832	-30717	P	h-	0.6518	1.6716	0.6523	318.0	171.9	-
14	-23	-0466	Jul 27	02:50:32	16520	-30494	P	a-	0.5839	1.7959	0.7775	323.3	183.2	-
15	-22	-0448	Aug 06	10:09:03	16217	-30271	P	a-	0.5220	1.9090	0.8913	327.3	191.6	-
16	-21	-0430	Aug 17	17:37:02	15923	-30048	P	a-	0.4667	2.0103	0.9929	330.3	197.9	-
17	-20	-0412	Aug 28	01:15:33	15636	-29825	T	a-	0.4191	2.0976	1.0804	332.3	202.4	43.4
18	-19	-0394	Sep 08	09:04:29	15356	-29602	T	a-	0.3790	2.1711	1.1541	333.5	205.5	58.5
19	-18	-0376	Sep 18	17:02:50	15084	-29379	T	a-	0.3460	2.2316	1.2147	334.1	207.7	67.5
20	-17	-0358	Sep 30	01:11:14	14818	-29156	T	p-	0.3205	2.2783	1.2616	334.3	209.0	73.1
21	-16	-0340	Oct 10	09:28:13	14558	-28933	T	p-	0.3013	2.3133	1.2970	334.1	209.7	76.7
22	-15	-0322	Oct 21	17:53:48	14304	-28710	T	p-	0.2885	2.3364	1.3208	333.5	210.0	78.8
23	-14	-0304	Nov 01	02:24:23	14055	-28487	T	p-	0.2792	2.3529	1.3384	332.8	210.0	80.2
24	-13	-0286	Nov 12	11:01:41	13813	-28264	T	p-	0.2749	2.3599	1.3471	331.9	209.7	80.8
25	-12	-0268	Nov 22	19:41:38	13575	-28041	T	p-	0.2727	2.3630	1.3523	330.9	209.4	81.0
26	-11	-0250	Dec 04	04:24:15	13342	-27818	T+	p-	0.2717	2.3635	1.3555	329.7	209.0	81.1
27	-10	-0232	Dec 14	13:05:15	13114	-27595	T+	p-	0.2689	2.3671	1.3622	328.7	208.7	81.6

28	-09	-0214	Dec 25	21:46:18	12891	-27372	T+	p-	0.2655	2.3713	1.3702	327.6	208.5	82.1
29	-08	-0195	Jan 05	06:23:26	12672	-27149	T+	p-	0.2585	2.3821	1.3852	326.6	208.5	83.1
30	-07	-0177	Jan 16	14:56:27	12457	-26926	T+	p-	0.2475	2.4000	1.4077	325.8	208.8	84.7
31	-06	-0159	Jan 26	23:23:16	12246	-26703	T+	p-	0.2309	2.4279	1.4405	325.1	209.3	86.8
32	-05	-0141	Feb 07	07:44:19	12039	-26480	T+	p-	0.2087	2.4660	1.4837	324.5	210.0	89.4
33	-04	-0123	Feb 17	15:57:45	11836	-26257	T+	p-	0.1799	2.5164	1.5393	324.0	210.9	92.2
34	-03	-0105	Mar 01	00:03:51	11636	-26034	T+	p-	0.1444	2.5788	1.6069	323.6	211.8	95.0
35	-02	-0087	Mar 11	08:02:33	11440	-25811	T+	p-	0.1023	2.6535	1.6867	323.2	212.6	97.4
36	-01	-0069	Mar 22	15:54:42	11246	-25588	T+	pp	0.0542	2.7392	1.7773	322.6	213.1	99.1
37	00	-0051	Apr 01	23:38:59	11056	-25365	T-	pp	-0.0009	2.8348	1.8774	321.8	213.2	99.7
38	01	-0033	Apr 13	07:18:16	10868	-25142	T-	pp	-0.0607	2.7230	1.7696	320.6	212.6	98.9
39	02	-0015	Apr 23	14:51:41	10683	-24919	T-	pp	-0.1259	2.6016	1.6518	318.9	211.1	96.3
40	03	0003	May 04	22:22:05	10501	-24696	T-	-p	-0.1939	2.4752	1.5284	316.7	208.7	91.3
41	04	0021	May 15	05:47:44	10320	-24473	T-	-p	-0.2664	2.3411	1.3967	313.8	205.1	83.2
42	05	0039	May 26	13:13:25	10141	-24250	T	-p	-0.3391	2.2067	1.2641	310.3	200.2	71.0
43	06	0057	Jun 05	20:37:27	9964	-24027	T	-a	-0.4139	2.0689	1.1273	306.0	194.0	51.4
44	07	0075	Jun 17	04:03:28	9789	-23804	P	-a	-0.4871	1.9344	0.9933	301.1	186.5	-
45	08	0093	Jun 27	11:30:09	9615	-23581	P	-a	-0.5600	1.8008	0.8593	295.5	177.5	-
46	09	0111	Jul 08	19:01:45	9442	-23358	P	-a	-0.6290	1.6747	0.7323	289.6	167.3	-
47	10	0129	Jul 19	02:36:35	9270	-23135	P	-a	-0.6956	1.5533	0.6093	283.1	155.6	-
48	11	0147	Jul 30	10:16:55	9098	-22912	P	-a	-0.7577	1.4404	0.4944	276.5	142.7	-
49	12	0165	Aug 09	18:03:16	8927	-22689	P	-a	-0.8148	1.3370	0.3883	269.8	128.5	-
50	13	0183	Aug 21	01:56:50	8756	-22466	P	-a	-0.8658	1.2449	0.2933	263.3	113.3	-
51	14	0201	Aug 31	09:58:02	8585	-22243	P	-a	-0.9106	1.1644	0.2095	257.3	96.9	-
52	15	0219	Sep 11	18:06:04	8414	-22020	P	-a	-0.9496	1.0945	0.1361	251.7	78.9	-
53	16	0237	Sep 22	02:22:53	8242	-21797	P	-a	-0.9814	1.0381	0.0760	247.0	59.5	-
54	17	0255	Oct 03	10:46:26	8071	-21574	P	-a	-1.0076	0.9917	0.0260	243.0	35.1	-
55	18	0273	Oct 13	19:17:34	7898	-21351	N	-a	-1.0274	0.9571	-0.0121	240.0	-	-

56	19	0291	Oct 25	03:54:20	7725 -21128	N	-a	-1.0426	0.9310	-0.0416	237.8	-	-
57	20	0309	Nov 04	12:37:24	7551 -20905	N	-a	-1.0526	0.9141	-0.0615	236.5	-	-
58	21	0327	Nov 15	21:23:53	7376 -20682	N	-a	-1.0597	0.9024	-0.0759	235.7	-	-
59	22	0345	Nov 26	06:13:23	7200 -20459	N	-a	-1.0644	0.8951	-0.0855	235.4	-	-
60	23	0363	Dec 07	15:03:53	7023 -20236	N	-a	-1.0680	0.8893	-0.0930	235.2	-	-
61	24	0381	Dec 17	23:54:43	6846 -20013	N	-a	-1.0710	0.8846	-0.0991	235.2	-	-
62	25	0399	Dec 29	08:42:19	6668 -19790	N	-a	-1.0766	0.8746	-0.1099	234.6	-	-
63	26	0418	Jan 08	17:26:39	6490 -19567	N	-a	-1.0848	0.8598	-0.1251	233.4	-	-
64	27	0436	Jan 20	02:05:05	6311 -19344	N	-a	-1.0973	0.8370	-0.1480	231.3	-	-
65	28	0454	Jan 30	10:38:22	6133 -19121	N	-a	-1.1136	0.8070	-0.1779	228.3	-	-
66	29	0472	Feb 10	19:01:59	5955 -18898	N	-a	-1.1372	0.7634	-0.2211	223.6	-	-
67	30	0490	Feb 21	03:18:45	5779 -18675	N	-a	-1.1660	0.7104	-0.2736	217.3	-	-
68	31	0508	Mar 03	11:24:46	5602 -18452	N	-a	-1.2031	0.6420	-0.3416	208.5	-	-
69	32	0526	Mar 14	19:23:31	5425 -18229	N	-a	-1.2455	0.5642	-0.4191	197.5	-	-
70	33	0544	Mar 25	03:10:43	5250 -18006	N	-a	-1.2964	0.4706	-0.5125	182.6	-	-
71	34	0562	Apr 05	10:51:17	5076 -17783	N	-a	-1.3520	0.3686	-0.6147	163.6	-	-
72	35	0580	Apr 15	18:21:52	4903 -17560	N	-a	-1.4151	0.2533	-0.7306	137.5	-	-
73	36	0598	Apr 27	01:46:02	4731 -17337	N	-a	-1.4824	0.1303	-0.8546	100.1	-	-

SAROS SERIES

61

Saros series 61 contains 78 lunar eclipses.

													PHASE
													DURATIONS
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-43	-0780 Dec 13	09:08:42	21499	-34373	N a-	-1.5529	0.0004	-0.9836	5.2	-	-	
02	-42	-0762 Dec 24	17:54:45	21202	-34150	N a-	-1.5469	0.0099	-0.9710	27.0	-	-	
03	-41	-0743 Jan 04	02:37:01	20906	-33927	N a-	-1.5378	0.0248	-0.9526	42.6	-	-	
04	-40	-0725 Jan 15	11:13:25	20613	-33704	N a-	-1.5238	0.0486	-0.9250	59.4	-	-	
05	-39	-0707 Jan 25	19:44:02	20322	-33481	N a-	-1.5050	0.0811	-0.8885	76.3	-	-	
06	-38	-0689 Feb 06	04:07:44	20032	-33258	N a-	-1.4804	0.1242	-0.8414	93.8	-	-	
07	-37	-0671 Feb 16	12:23:12	19745	-33035	N a-	-1.4490	0.1797	-0.7817	112.1	-	-	
08	-36	-0653 Feb 27	20:31:24	19460	-32812	N a-	-1.4115	0.2465	-0.7109	130.2	-	-	
09	-35	-0635 Mar 10	04:31:39	19177	-32589	N a-	-1.3676	0.3252	-0.6284	148.2	-	-	
10	-34	-0617 Mar 21	12:24:31	18896	-32366	N a-	-1.3176	0.4151	-0.5349	165.8	-	-	
11	-33	-0599 Mar 31	20:10:02	18617	-32143	N a-	-1.2614	0.5166	-0.4303	183.0	-	-	
12	-32	-0581 Apr 12	03:49:35	18340	-31920	N a-	-1.2003	0.6273	-0.3169	199.3	-	-	
13	-31	-0563 Apr 22	11:24:14	18065	-31697	N a-	-1.1351	0.7459	-0.1963	214.6	-	-	
14	-30	-0545 May 03	18:53:36	17792	-31474	N a-	-1.0655	0.8729	-0.0678	229.0	-	-	
15	-29	-0527 May 14	02:20:49	17522	-31251	P a-	-0.9942	1.0034	0.0635	242.2	54.4	-	
16	-28	-0509 May 25	09:45:33	17253	-31028	P a-	-0.9209	1.1378	0.1980	254.2	94.4	-	
17	-27	-0491 Jun 04	17:10:51	16957	-30805	P a-	-0.8480	1.2719	0.3315	264.9	119.9	-	
18	-26	-0473 Jun 16	00:35:06	16642	-30582	P a-	-0.7742	1.4078	0.4662	274.6	139.4	-	
19	-25	-0455 Jun 26	08:02:56	16336	-30359	P a-	-0.7037	1.5383	0.5947	282.9	154.5	-	
20	-24	-0437 Jul 07	15:32:32	16038	-30136	P a-	-0.6348	1.6659	0.7198	290.3	166.7	-	

21 -23 -0419 Jul 17 23:07:23 15748 -29913 P a- -0.5707 1.7851 0.8359 296.6 176.4 -

22 -22 -0401 Jul 29 06:46:08 15466 -29690 P a- -0.5100 1.8983 0.9454 302.0 184.3 -

23 -21 -0383 Aug 08 14:32:35 15191 -29467 T a- -0.4562 1.9991 1.0422 306.5 190.3 30.4

24 -20 -0365 Aug 19 22:25:01 14922 -29244 T p- -0.4080 2.0899 1.1285 310.3 195.1 51.8

25 -19 -0347 Aug 30 06:24:49 14660 -29021 T p- -0.3664 2.1685 1.2024 313.6 198.8 63.6

26 -18 -0329 Sep 10 14:31:50 14403 -28798 T p- -0.3314 2.2351 1.2642 316.3 201.7 71.2

27 -17 -0311 Sep 20 22:46:51 14153 -28575 T p- -0.3037 2.2885 1.3127 318.6 203.8 76.3

28 -16 -0293 Oct 02 07:08:43 13908 -28352 T p- -0.2822 2.3304 1.3498 320.5 205.4 79.7

29 -15 -0275 Oct 12 15:37:12 13668 -28129 T- p- -0.2668 2.3611 1.3758 322.2 206.5 81.9

30 -14 -0257 Oct 24 00:11:26 13433 -27906 T- p- -0.2567 2.3817 1.3921 323.7 207.4 83.2

31 -13 -0239 Nov 03 08:51:00 13203 -27683 T- p- -0.2514 2.3934 1.3998 325.0 208.0 83.9

32 -12 -0221 Nov 14 17:33:03 12978 -27460 T- p- -0.2488 2.4000 1.4029 326.2 208.5 84.2

33 -11 -0203 Nov 25 02:18:04 12758 -27237 T- p- -0.2489 2.4013 1.4011 327.3 208.9 84.2

34 -10 -0185 Dec 06 11:02:24 12541 -27014 T- p- -0.2488 2.4027 1.4000 328.3 209.3 84.3

35 -09 -0167 Dec 16 19:46:18 12329 -26791 T- p- -0.2491 2.4033 1.3986 329.3 209.8 84.4

36 -08 -0149 Dec 28 04:25:19 12120 -26568 T- p- -0.2456 2.4104 1.4043 330.5 210.5 85.0

37 -07 -0130 Jan 07 13:01:18 11916 -26345 T- p- -0.2402 2.4207 1.4136 331.7 211.3 85.9

38 -06 -0112 Jan 18 21:29:54 11714 -26122 T- p- -0.2290 2.4417 1.4339 333.1 212.5 87.5

39 -05 -0094 Jan 29 05:51:34 11517 -25899 T- p- -0.2129 2.4715 1.4633 334.6 213.9 89.6

40 -04 -0076 Feb 09 14:03:32 11322 -25676 T- pp -0.1894 2.5147 1.5064 336.3 215.6 92.3

41 -03 -0058 Feb 19 22:07:06 11131 -25453 T- pp -0.1597 2.5691 1.5608 338.0 217.4 95.2

42 -02 -0040 Mar 02 06:00:35 10942 -25230 T- pp -0.1223 2.6378 1.6294 339.9 219.2 98.1

43 -01 -0022 Mar 13 13:43:41 10756 -25007 T- pp -0.0772 2.7207 1.7121 341.6 220.9 100.6

44 00 -0004 Mar 23 21:17:09 10572 -24784 T- pp -0.0248 2.8170 1.8080 343.2 222.2 102.2

45 01 0014 Apr 04 04:41:23 10391 -24561 T+ pp 0.0341 2.8002 1.7906 344.4 222.9 102.4

46 02 0032 Apr 14 11:56:36 10212 -24338 T+ pp 0.0997 2.6803 1.6697 345.1 222.7 100.6

47 03 0050 Apr 25 19:03:44 10034 -24115 T+ -p 0.1712 2.5498 1.5378 345.1 221.2 96.0

48 04 0068 May 06 02:04:08 9858 -23892 T+ -p 0.2473 2.4112 1.3973 344.2 218.4 87.6

49	05	0086	May 17	08:59:30	9684	-23669	T	-h	0.3265	2.2670	1.2507	342.3	213.8	73.6	
50	06	0104	May 27	15:49:27	9510	-23446	T	-h	0.4092	2.1168	1.0976	339.3	207.1	48.4	
51	07	0122	Jun 07	22:37:31	9338	-23223	P	-t	0.4923	1.9660	0.9434	335.2	198.3	-	
52	08	0140	Jun 18	05:23:41	9166	-23000	P	-t	0.5756	1.8152	0.7886	329.9	186.9	-	
53	09	0158	Jun 29	12:11:02	8994	-22777	P	-t	0.6571	1.6678	0.6369	323.5	172.9	-	
54	10	0176	Jul 09	18:58:00	8823	-22554	P	-t	0.7375	1.5227	0.4868	316.0	155.3	-	
55	11	0194	Jul 21	01:49:29	8653	-22331	P	-t	0.8131	1.3867	0.3457	307.7	134.1	-	
56	12	0212	Jul 31	08:43:57	8481	-22108	P	-t	0.8847	1.2581	0.2114	298.7	107.3	-	
57	13	0230	Aug 11	15:44:30	8310	-21885	P	-t	0.9503	1.1406	0.0882	289.3	70.7	-	
58	14	0248	Aug 21	22:50:28	8138	-21662	Nx	-t	1.0104	1.0334	-0.0250	279.7	-	-	
59	15	0266	Sep 02	06:04:50	7966	-21439	N	-t	1.0628	0.9402	-0.1240	270.5	-	-	
60	16	0284	Sep 12	13:26:43	7793	-21216	N	-t	1.1079	0.8605	-0.2098	261.9	-	-	
61	17	0302	Sep 23	20:55:33	7619	-20993	N	-t	1.1466	0.7923	-0.2836	254.0	-	-	
62	18	0320	Oct 04	04:32:57	7445	-20770	N	-t	1.1776	0.7382	-0.3432	247.3	-	-	
63	19	0338	Oct 15	12:17:29	7269	-20547	N	-t	1.2024	0.6952	-0.3911	241.8	-	-	
64	20	0356	Oct 25	20:09:25	7093	-20324	N	-t	1.2205	0.6642	-0.4266	237.7	-	-	
65	21	0374	Nov 06	04:05:36	6916	-20101	N	-t	1.2348	0.6398	-0.4548	234.5	-	-	
66	22	0392	Nov 16	12:07:33	6738	-19878	N	-t	1.2440	0.6245	-0.4732	232.5	-	-	
67	23	0410	Nov 27	20:11:18	6560	-19655	N	-t	1.2516	0.6118	-0.4882	230.9	-	-	
68	24	0428	Dec 08	04:16:29	6382	-19432	N	-t	1.2575	0.6018	-0.4998	229.6	-	-	
69	25	0446	Dec 19	12:20:01	6203	-19209	N	-t	1.2645	0.5893	-0.5130	227.7	-	-	
70	26	0464	Dec 29	20:21:47	6025	-18986	N	-t	1.2725	0.5744	-0.5277	225.4	-	-	
71	27	0483	Jan 10	04:18:09	5848	-18763	N	-t	1.2846	0.5520	-0.5493	221.6	-	-	
72	28	0501	Jan 20	12:08:52	5672	-18540	N	-t	1.3008	0.5214	-0.5784	216.0	-	-	
73	29	0519	Jan 31	19:52:03	5495	-18317	N	-t	1.3228	0.4800	-0.6176	208.1	-	-	
74	30	0537	Feb 11	03:27:52	5319	-18094	N	-t	1.3504	0.4279	-0.6671	197.4	-	-	
75	31	0555	Feb 22	10:52:57	5144	-17871	N	-t	1.3863	0.3607	-0.7313	182.3	-	-	
76	32	0573	Mar 04	18:10:09	4971	-17648	N	-t	1.4279	0.2825	-0.8062	162.4	-	-	

77 33 0591 Mar 16 01:16:48 4799 -17425 N -t 1.4777 0.1894 -0.8958 134.0 - -
78 34 0609 Mar 26 08:16:40 4628 -17202 Ne -t 1.5328 0.0866 -0.9951 91.3 - -

SAROS SERIES

62

Saros series 62 contains 74 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-36	-0624 Feb 08	07:39:48	19006	-32454	N h-	1.5550	0.0224	-1.0129	43.7	-	-		
02	-35	-0606 Feb 18	15:27:17	18727	-32231	N t-	1.5278	0.0724	-0.9629	78.5	-	-		
03	-34	-0588 Feb 29	23:04:08	18449	-32008	N t-	1.4929	0.1363	-0.8990	107.5	-	-		
04	-33	-0570 Mar 12	06:30:25	18173	-31785	N t-	1.4505	0.2142	-0.8211	134.3	-	-		
05	-32	-0552 Mar 22	13:46:39	17900	-31562	N t-	1.4007	0.3058	-0.7298	159.6	-	-		
06	-31	-0534 Apr 02	20:53:22	17628	-31339	N t-	1.3440	0.4100	-0.6261	183.7	-	-		
07	-30	-0516 Apr 13	03:50:34	17359	-31116	N t-	1.2805	0.5269	-0.5101	206.6	-	-		

08 -29 -0498 Apr 24 10:40:33 17084 -30893 N t- 1.2117 0.6538 -0.3843 228.1 - -

09 -28 -0480 May 04 17:24:01 16765 -30670 N t- 1.1379 0.7899 -0.2498 248.2 - -

10 -27 -0462 May 16 00:01:49 16456 -30447 N t- 1.0601 0.9338 -0.1079 266.8 - -

11 -26 -0444 May 26 06:36:23 16155 -30224 P t- 0.9799 1.0823 0.0380 283.8 46.9 -

12 -25 -0426 Jun 06 13:08:38 15862 -30001 P t- 0.8981 1.2338 0.1866 299.1 102.0 -

13 -24 -0408 Jun 16 19:41:05 15576 -29778 P t- 0.8168 1.3847 0.3341 312.6 133.9 -

14 -23 -0390 Jun 28 02:12:52 15298 -29555 P t- 0.7353 1.5362 0.4817 324.6 157.6 -

15 -22 -0372 Jul 08 08:48:47 15027 -29332 P t- 0.6574 1.6812 0.6226 334.9 175.5 -

16 -21 -0354 Jul 19 15:27:26 14762 -29109 P t- 0.5819 1.8220 0.7588 343.7 189.7 -

17 -20 -0336 Jul 29 22:13:02 14504 -28886 P t- 0.5126 1.9516 0.8838 351.0 200.6 -

18 -19 -0318 Aug 10 05:03:13 14251 -28663 T t- 0.4474 2.0737 1.0009 357.1 209.3 4.9

19 -18 -0300 Aug 20 12:03:15 14004 -28440 T t- 0.3904 2.1807 1.1031 362.0 215.7 51.3

20 -17 -0282 Aug 31 19:09:38 13762 -28217 T p- 0.3389 2.2778 1.1952 366.0 220.6 68.5

21 -16 -0264 Sep 11 02:25:28 13525 -27994 T p- 0.2954 2.3600 1.2726 369.1 224.2 78.7

22 -15 -0246 Sep 22 09:49:03 13294 -27771 T+ pp 0.2584 2.4302 1.3383 371.6 226.9 85.6

23 -14 -0228 Oct 02 17:22:38 13067 -27548 T+ pp 0.2300 2.4843 1.3883 373.5 228.7 89.9

24 -13 -0210 Oct 14 01:03:18 12844 -27325 T+ pp 0.2072 2.5280 1.4284 374.9 229.9 92.8

25 -12 -0192 Oct 24 08:51:03 12626 -27102 T+ pp 0.1902 2.5606 1.4580 376.0 230.8 94.7

26 -11 -0174 Nov 04 16:44:45 12412 -26879 T+ pp 0.1782 2.5839 1.4789 376.7 231.4 96.0

27 -10 -0156 Nov 15 00:43:42 12202 -26656 T+ pp 0.1708 2.5983 1.4919 377.2 231.7 96.7

28 -09 -0138 Nov 26 08:44:12 11996 -26433 T+ pp 0.1644 2.6104 1.5033 377.5 231.9 97.3

29 -08 -0120 Dec 06 16:46:18 11793 -26210 T+ pp 0.1594 2.6195 1.5124 377.6 232.1 97.7

30 -07 -0102 Dec 18 00:46:42 11594 -25987 T+ pp 0.1529 2.6309 1.5248 377.5 232.4 98.4

31 -06 -0084 Dec 28 08:45:39 11398 -25764 T+ pp 0.1452 2.6442 1.5398 377.3 232.6 99.1

32 -05 -0065 Jan 08 16:38:18 11206 -25541 T+ pp 0.1325 2.6662 1.5643 377.1 233.0 100.2

33 -04 -0047 Jan 19 00:27:01 11016 -25318 T+ pp 0.1164 2.6941 1.5954 376.8 233.4 101.4

34 -03 -0029 Jan 30 08:07:01 10829 -25095 T+ pp 0.0933 2.7346 1.6396 376.4 233.9 102.9

35 -02 -0011 Feb 09 15:40:17 10645 -24872 T+ pp 0.0643 2.7856 1.6950 375.8 234.4 104.2

36	-01	0007 Feb 20	23:03:27	10462 -24649	T+	pp	0.0268	2.8521	1.7661	375.1	234.7	105.2
37	00	0025 Mar 03	06:19:48	10282 -24426	T-	pp	-0.0166	2.8684	1.7873	374.0	234.5	105.5
38	01	0043 Mar 14	13:26:49	10104 -24203	T-	pp	-0.0678	2.7719	1.6958	372.6	233.8	104.4
39	02	0061 Mar 24	20:25:56	9927 -23980	T-	pp	-0.1262	2.6622	1.5911	370.5	232.2	101.4
40	03	0079 Apr 05	03:17:40	9752 -23757	T-	pp	-0.1912	2.5405	1.4743	367.7	229.5	95.7
41	04	0097 Apr 15	10:03:20	9578 -23534	T-	pp	-0.2619	2.4082	1.3469	363.9	225.3	86.1
42	05	0115 Apr 26	16:44:15	9406 -23311	T	-t	-0.3370	2.2682	1.2113	359.2	219.4	70.5
43	06	0133 May 06	23:20:42	9234 -23088	T	-t	-0.4163	2.1205	1.0679	353.3	211.5	41.8
44	07	0151 May 18	05:55:48	9062 -22865	P	-t	-0.4975	1.9696	0.9208	346.2	201.4	-
45	08	0169 May 28	12:29:57	8891 -22642	P	-t	-0.5803	1.8161	0.7707	337.9	188.7	-
46	09	0187 Jun 08	19:04:52	8720 -22419	P	-t	-0.6630	1.6628	0.6204	328.3	173.2	-
47	10	0205 Jun 19	01:42:04	8549 -22196	P	-t	-0.7444	1.5122	0.4723	317.7	154.3	-
48	11	0223 Jun 30	08:23:17	8378 -21973	P	-t	-0.8231	1.3666	0.3288	306.1	131.2	-
49	12	0241 Jul 10	15:10:04	8206 -21750	P	-t	-0.8980	1.2284	0.1922	293.7	102.0	-
50	13	0259 Jul 21	22:02:33	8034 -21527	P	-t	-0.9690	1.0975	0.0625	280.6	59.1	-
51	14	0277 Aug 01	05:03:37	7861 -21304	N	-t	-1.0338	0.9783	-0.0559	267.4	-	-
52	15	0295 Aug 12	12:13:01	7688 -21081	N	-t	-1.0926	0.8701	-0.1636	254.2	-	-
53	16	0313 Aug 22	19:32:44	7514 -20858	N	-t	-1.1438	0.7761	-0.2573	241.6	-	-
54	17	0331 Sep 03	03:01:45	7339 -20635	N	-t	-1.1882	0.6945	-0.3388	229.6	-	-
55	18	0349 Sep 13	10:42:02	7163 -20412	N	-h	-1.2247	0.6274	-0.4058	219.0	-	-
56	19	0367 Sep 24	18:32:06	6986 -20189	N	-h	-1.2542	0.5733	-0.4599	209.8	-	-
57	20	0385 Oct 05	02:31:49	6808 -19966	N	-h	-1.2768	0.5317	-0.5012	202.2	-	-
58	21	0403 Oct 16	10:41:10	6630 -19743	N	-h	-1.2926	0.5025	-0.5300	196.5	-	-
59	22	0421 Oct 26	18:58:40	6452 -19520	N	-a	-1.3024	0.4841	-0.5477	192.6	-	-
60	23	0439 Nov 07	03:23:48	6274 -19297	N	-a	-1.3072	0.4747	-0.5559	190.2	-	-
61	24	0457 Nov 17	11:53:00	6096 -19074	N	-a	-1.3095	0.4696	-0.5592	188.7	-	-
62	25	0475 Nov 28	20:27:36	5918 -18851	N	-a	-1.3082	0.4709	-0.5557	188.3	-	-
63	26	0493 Dec 09	05:03:29	5742 -18628	N	-a	-1.3062	0.4732	-0.5506	188.0	-	-

64	27	0511	Dec 20	13:40:30	5565	-18405	N	-a	-1.3042	0.4752	-0.5453	187.7	-	-
65	28	0529	Dec 30	22:14:57	5388	-18182	N	-a	-1.3046	0.4724	-0.5441	186.5	-	-
66	29	0548	Jan 11	06:47:52	5213	-17959	N	-a	-1.3071	0.4655	-0.5465	184.6	-	-
67	30	0566	Jan 21	15:15:54	5039	-17736	N	-a	-1.3141	0.4503	-0.5568	181.1	-	-
68	31	0584	Feb 01	23:38:54	4867	-17513	N	-a	-1.3256	0.4264	-0.5754	175.9	-	-
69	32	0602	Feb 12	07:55:24	4695	-17290	N	-a	-1.3431	0.3917	-0.6046	168.5	-	-
70	33	0620	Feb 23	16:05:46	4526	-17067	N	-a	-1.3661	0.3465	-0.6442	158.5	-	-
71	34	0638	Mar 06	00:08:14	4357	-16844	N	-a	-1.3962	0.2885	-0.6964	144.9	-	-
72	35	0656	Mar 16	08:04:06	4190	-16621	N	-a	-1.4322	0.2196	-0.7597	126.7	-	-
73	36	0674	Mar 27	15:52:43	4025	-16398	N	-a	-1.4746	0.1390	-0.8348	101.2	-	-
74	37	0692	Apr 06	23:36:07	3862	-16175	Ne	-a	-1.5217	0.0499	-0.9187	60.9	-	-

SAROS SERIES

63

Saros series 63 contains 82 lunar eclipses.

PHASE													
DURATIONS													
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m

GREATEST

ECLIPSE

01	-43	-0722	Nov 03	05:33:53	20551	-33657	N	t-	-1.5822	0.0062	-1.0958	24.7	-	-
02	-42	-0704	Nov 13	13:35:34	20260	-33434	N	t-	-1.5756	0.0182	-1.0838	42.1	-	-
03	-41	-0686	Nov 24	21:39:43	19972	-33211	N	t-	-1.5704	0.0274	-1.0737	51.6	-	-
04	-40	-0668	Dec 05	05:44:41	19685	-32988	N	t-	-1.5652	0.0361	-1.0633	59.0	-	-
05	-39	-0650	Dec 16	13:49:32	19400	-32765	N	t-	-1.5591	0.0460	-1.0508	66.5	-	-
06	-38	-0632	Dec 26	21:50:06	19117	-32542	N	t-	-1.5490	0.0628	-1.0307	77.4	-	-
07	-37	-0613	Jan 07	05:47:23	18837	-32319	N	t-	-1.5357	0.0852	-1.0043	89.7	-	-
08	-36	-0595	Jan 17	13:37:39	18558	-32096	N	t-	-1.5161	0.1188	-0.9660	105.3	-	-
09	-35	-0577	Jan 28	21:22:38	18282	-31873	N	t-	-1.4916	0.1611	-0.9186	121.7	-	-
10	-34	-0559	Feb 08	04:57:58	18008	-31650	N	t-	-1.4586	0.2188	-0.8552	140.7	-	-
11	-33	-0541	Feb 19	12:27:33	17735	-31427	N	t-	-1.4200	0.2867	-0.7814	159.4	-	-
12	-32	-0523	Mar 01	19:47:32	17465	-31204	N	t-	-1.3729	0.3701	-0.6919	179.0	-	-
13	-31	-0505	Mar 13	03:00:44	17197	-30981	N	t-	-1.3192	0.4655	-0.5904	198.2	-	-
14	-30	-0487	Mar 23	10:05:34	16890	-30758	N	t-	-1.2577	0.5752	-0.4747	217.1	-	-
15	-29	-0469	Apr 03	17:05:26	16577	-30535	N	t-	-1.1910	0.6946	-0.3494	234.8	-	-
16	-28	-0451	Apr 13	23:59:40	16272	-30312	N	t-	-1.1184	0.8251	-0.2132	251.5	-	-
17	-27	-0433	Apr 25	06:49:35	15976	-30089	N	t-	-1.0409	0.9646	-0.0684	266.8	-	-
18	-26	-0415	May 05	13:37:08	15688	-29866	P	t-	-0.9603	1.1100	0.0818	280.6	67.2	-
19	-25	-0397	May 16	20:23:42	15407	-29643	P	t-	-0.8778	1.2592	0.2355	292.7	111.2	-
20	-24	-0379	May 27	03:10:26	15133	-29420	P	h-	-0.7940	1.4109	0.3911	303.2	139.5	-
21	-23	-0361	Jun 07	09:58:28	14866	-29197	P	h-	-0.7101	1.5633	0.5469	312.1	160.5	-
22	-22	-0343	Jun 17	16:50:00	14605	-28974	P	h-	-0.6277	1.7129	0.6994	319.4	176.5	-
23	-21	-0325	Jun 28	23:46:26	14350	-28751	P	h-	-0.5486	1.8569	0.8457	325.1	188.6	-
24	-20	-0307	Jul 09	06:47:43	14101	-28528	P	a-	-0.4725	1.9957	0.9864	329.6	198.0	-
25	-19	-0289	Jul 20	13:56:49	13857	-28305	T	a-	-0.4018	2.1247	1.1168	332.9	204.8	51.9

26	-18	-0271	Jul 30	21:13:33	13618	-28082	T	a-	-0.3365	2.2440	1.2370	335.2	209.8	70.9
27	-17	-0253	Aug 11	04:40:22	13385	-27859	T	p-	-0.2787	2.3497	1.3434	336.5	213.1	81.9
28	-16	-0235	Aug 21	12:14:55	13156	-27636	T-	p-	-0.2264	2.4456	1.4395	337.2	215.4	89.0
29	-15	-0217	Sep 01	20:00:56	12931	-27413	T-	p-	-0.1829	2.5253	1.5194	337.4	216.7	93.4
30	-14	-0199	Sep 12	03:55:36	12712	-27190	T-	p-	-0.1457	2.5935	1.5876	337.2	217.3	96.2
31	-13	-0181	Sep 23	12:01:18	12496	-26967	T-	p-	-0.1168	2.6466	1.6407	336.7	217.5	97.7
32	-12	-0163	Oct 03	20:14:56	12284	-26744	T-	p-	-0.0938	2.6888	1.6830	336.0	217.3	98.6
33	-11	-0145	Oct 15	04:38:38	12077	-26521	T-	p-	-0.0782	2.7172	1.7118	335.2	217.0	98.9
34	-10	-0127	Oct 25	13:09:00	11873	-26298	T-	p-	-0.0676	2.7363	1.7316	334.3	216.6	99.0
35	-09	-0109	Nov 05	21:45:46	11672	-26075	T-	p-	-0.0615	2.7469	1.7432	333.3	216.1	99.0
36	-08	-0091	Nov 16	06:26:52	11475	-25852	T-	p-	-0.0585	2.7518	1.7495	332.4	215.7	98.9
37	-07	-0073	Nov 27	15:11:43	11282	-25629	T-	p-	-0.0577	2.7522	1.7519	331.3	215.2	98.8
38	-06	-0055	Dec 07	23:57:04	11091	-25406	T-	p-	-0.0571	2.7521	1.7543	330.3	214.8	98.7
39	-05	-0037	Dec 19	08:41:57	10903	-25183	T-	p-	-0.0554	2.7536	1.7588	329.3	214.4	98.6
40	-04	-0019	Dec 29	17:24:40	10717	-24960	T-	p-	-0.0514	2.7592	1.7679	328.2	214.1	98.7
41	-03	0000	Jan 10	02:04:40	10534	-24737	T-	p-	-0.0445	2.7699	1.7825	327.2	213.8	98.8
42	-02	0018	Jan 20	10:38:27	10353	-24514	T-	pp	-0.0319	2.7909	1.8078	326.2	213.6	99.0
43	-01	0036	Jan 31	19:07:10	10174	-24291	T-	pp	-0.0146	2.8203	1.8418	325.2	213.4	99.2
44	00	0054	Feb 11	03:28:21	9997	-24068	T+	pp	0.0096	2.8272	1.8533	324.1	213.2	99.2
45	01	0072	Feb 22	11:43:32	9821	-23845	T+	pp	0.0393	2.7703	1.8012	323.0	212.8	98.9
46	02	0090	Mar 04	19:49:38	9647	-23622	T+	pp	0.0773	2.6982	1.7338	321.7	212.1	98.0
47	03	0108	Mar 15	03:50:07	9474	-23399	T+	pp	0.1205	2.6167	1.6568	320.2	211.1	96.2
48	04	0126	Mar 26	11:42:21	9301	-23176	T+	-p	0.1710	2.5218	1.5662	318.4	209.4	92.9
49	05	0144	Apr 05	19:28:30	9130	-22953	T+	-p	0.2270	2.4170	1.4653	316.1	207.0	87.7
50	06	0162	Apr 17	03:08:02	8958	-22730	T	-p	0.2891	2.3014	1.3531	313.2	203.5	79.6
51	07	0180	Apr 27	10:43:18	8787	-22507	T	-p	0.3549	2.1792	1.2339	309.7	198.9	67.4
52	08	0198	May 08	18:14:34	8617	-22284	T	-a	0.4244	2.0505	1.1075	305.5	193.0	47.5
53	09	0216	May 19	01:42:04	8445	-22061	P	-a	0.4971	1.9161	0.9749	300.4	185.4	-

54	10	0234	May 30	09:08:40	8274	-21838	P	-a	0.5705	1.7809	0.8406	294.6	176.1	-
55	11	0252	Jun 09	16:34:22	8102	-21615	P	-a	0.6446	1.6448	0.7050	287.9	164.9	-
56	12	0270	Jun 21	00:01:05	7930	-21392	P	-a	0.7179	1.5104	0.5703	280.4	151.5	-
57	13	0288	Jul 01	07:28:44	7757	-21169	P	-a	0.7903	1.3781	0.4369	272.1	135.4	-
58	14	0306	Jul 12	15:00:40	7583	-20946	P	-a	0.8591	1.2526	0.3099	263.4	116.2	-
59	15	0324	Jul 22	22:36:23	7408	-20723	P	-a	0.9244	1.1340	0.1890	254.2	92.3	-
60	16	0342	Aug 03	06:17:24	7232	-20500	P	-a	0.9852	1.0238	0.0762	244.7	59.5	-
61	17	0360	Aug 13	14:04:29	7056	-20277	N	-a	1.0409	0.9232	-0.0276	235.2	-	-
62	18	0378	Aug 24	21:59:16	6879	-20054	N	-a	1.0902	0.8346	-0.1199	226.1	-	-
63	19	0396	Sep 04	06:01:12	6701	-19831	N	-a	1.1333	0.7573	-0.2010	217.4	-	-
64	20	0414	Sep 15	14:10:10	6523	-19608	N	-a	1.1706	0.6910	-0.2714	209.5	-	-
65	21	0432	Sep 25	22:27:10	6344	-19385	N	-a	1.2010	0.6373	-0.3292	202.7	-	-
66	22	0450	Oct 07	06:51:37	6166	-19162	N	-a	1.2254	0.5946	-0.3760	197.1	-	-
67	23	0468	Oct 17	15:22:37	5988	-18939	N	-a	1.2442	0.5620	-0.4125	192.6	-	-
68	24	0486	Oct 28	23:59:43	5811	-18716	N	-a	1.2580	0.5388	-0.4396	189.5	-	-
69	25	0504	Nov 08	08:41:40	5635	-18493	N	-a	1.2677	0.5226	-0.4591	187.4	-	-
70	26	0522	Nov 19	17:27:50	5458	-18270	N	-a	1.2737	0.5132	-0.4716	186.3	-	-
71	27	0540	Nov 30	02:14:49	5282	-18047	N	-a	1.2789	0.5048	-0.4825	185.3	-	-
72	28	0558	Dec 11	11:03:49	5108	-17824	N	-a	1.2824	0.4995	-0.4899	184.9	-	-
73	29	0576	Dec 21	19:50:46	4935	-17601	N	-a	1.2876	0.4907	-0.5003	183.9	-	-
74	30	0595	Jan 02	04:36:03	4763	-17378	N	-a	1.2938	0.4799	-0.5122	182.5	-	-
75	31	0613	Jan 12	13:15:27	4592	-17155	N	-a	1.3047	0.4602	-0.5326	179.5	-	-
76	32	0631	Jan 23	21:50:58	4423	-16932	N	-a	1.3184	0.4352	-0.5579	175.4	-	-
77	33	0649	Feb 03	06:18:35	4256	-16709	N	-a	1.3386	0.3983	-0.5949	168.8	-	-
78	34	0667	Feb 14	14:38:46	4090	-16486	N	-a	1.3642	0.3512	-0.6419	159.6	-	-
79	35	0685	Feb 24	22:49:22	3926	-16263	N	-a	1.3972	0.2906	-0.7023	146.4	-	-
80	36	0703	Mar 08	06:51:47	3764	-16040	N	-a	1.4362	0.2190	-0.7738	128.3	-	-
81	37	0721	Mar 18	14:44:16	3605	-15817	N	-a	1.4826	0.1337	-0.8590	101.3	-	-

SAROS SERIES

64

Saros series 64 contains 84 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-48	-0783 Aug 20 06:56:22	21554 -34414	N	a-	1.5166	0.0660	-0.9159	70.7	-	-			
02	-47	-0765 Aug 31 14:54:41	21256 -34191	N	a-	1.4739	0.1445	-0.8377	103.5	-	-			
03	-46	-0747 Sep 10 23:02:40	20961 -33968	N	a-	1.4383	0.2101	-0.7727	123.8	-	-			
04	-45	-0729 Sep 22 07:19:06	20667 -33745	N	a-	1.4090	0.2642	-0.7192	137.8	-	-			
05	-44	-0711 Oct 02 15:45:11	20375 -33522	N	a-	1.3869	0.3050	-0.6789	147.1	-	-			
06	-43	-0693 Oct 14 00:18:26	20085 -33299	N	a-	1.3701	0.3359	-0.6481	153.7	-	-			
07	-42	-0675 Oct 24 08:58:29	19798 -33076	N	a-	1.3586	0.3569	-0.6271	157.8	-	-			
08	-41	-0657 Nov 04 17:43:30	19512 -32853	N	a-	1.3509	0.3709	-0.6127	160.3	-	-			

09	-40	-0639	Nov 15	02:32:52	19229	-32630	N	a-	1.3466	0.3784	-0.6044	161.5	-	-
10	-39	-0621	Nov 26	11:23:47	18947	-32407	N	a-	1.3434	0.3835	-0.5979	162.2	-	-
11	-38	-0603	Dec 06	20:14:54	18668	-32184	N	a-	1.3404	0.3882	-0.5915	162.8	-	-
12	-37	-0585	Dec 18	05:04:47	18391	-31961	N	a-	1.3364	0.3944	-0.5830	163.7	-	-
13	-36	-0567	Dec 28	13:52:25	18116	-31738	N	a-	1.3310	0.4029	-0.5719	165.0	-	-
14	-35	-0548	Jan 08	22:34:35	17842	-31515	N	a-	1.3210	0.4196	-0.5520	167.9	-	-
15	-34	-0530	Jan 19	07:11:40	17571	-31292	N	a-	1.3071	0.4435	-0.5249	171.9	-	-
16	-33	-0512	Jan 30	15:41:34	17302	-31069	N	a-	1.2875	0.4778	-0.4870	177.5	-	-
17	-32	-0494	Feb 10	00:05:32	17016	-30846	N	a-	1.2631	0.5207	-0.4405	184.3	-	-
18	-31	-0476	Feb 21	08:19:53	16699	-30623	N	a-	1.2310	0.5778	-0.3799	192.8	-	-
19	-30	-0458	Mar 03	16:28:09	16391	-30400	N	a-	1.1940	0.6440	-0.3103	202.0	-	-
20	-29	-0440	Mar 14	00:27:01	16092	-30177	N	a-	1.1490	0.7249	-0.2261	212.4	-	-
21	-28	-0422	Mar 25	08:20:04	15801	-29954	N	a-	1.0994	0.8144	-0.1338	222.9	-	-
22	-27	-0404	Apr 04	16:04:16	15517	-29731	N	a-	1.0425	0.9176	-0.0281	233.9	-	-
23	-26	-0386	Apr 15	23:44:19	15241	-29508	P	a-	0.9822	1.0272	0.0835	244.6	62.2	-
24	-25	-0368	Apr 26	07:17:52	14971	-29285	P	a-	0.9165	1.1471	0.2047	255.1	95.9	-
25	-24	-0350	May 07	14:47:45	14707	-29062	P	a-	0.8479	1.2727	0.3311	265.1	119.8	-
26	-23	-0332	May 17	22:14:03	14450	-28839	P	a-	0.7762	1.4043	0.4627	274.4	139.0	-
27	-22	-0314	May 29	05:38:56	14198	-28616	P	a-	0.7034	1.5380	0.5959	282.9	154.7	-
28	-21	-0296	Jun 08	13:02:48	13952	-28393	P	a-	0.6302	1.6731	0.7297	290.6	167.7	-
29	-20	-0278	Jun 19	20:26:49	13712	-28170	P	a-	0.5573	1.8078	0.8625	297.5	178.5	-
30	-19	-0260	Jun 30	03:53:01	13476	-27947	P	a-	0.4865	1.9391	0.9911	303.4	187.3	-
31	-18	-0242	Jul 11	11:22:22	13245	-27724	T	a-	0.4183	2.0658	1.1147	308.5	194.4	49.2
32	-17	-0224	Jul 21	18:55:36	13019	-27501	T	p-	0.3539	2.1859	1.2310	312.9	200.1	67.4
33	-16	-0206	Aug 02	02:34:13	12798	-27278	T	p-	0.2943	2.2974	1.3382	316.5	204.5	78.7
34	-15	-0188	Aug 12	10:19:03	12581	-27055	T+	p-	0.2403	2.3987	1.4349	319.6	207.7	86.2
35	-14	-0170	Aug 23	18:10:56	12367	-26832	T+	p-	0.1926	2.4889	1.5200	322.2	210.2	91.3
36	-13	-0152	Sep 03	02:08:53	12158	-26609	T+	p-	0.1503	2.5691	1.5951	324.3	212.0	94.6

37	-12	-0134	Sep 14	10:15:22	11953	-26386	T+	pp	0.1156	2.6355	1.6562	326.2	213.2	96.7
38	-11	-0116	Sep 24	18:28:42	11751	-26163	T+	pp	0.0873	2.6900	1.7054	327.9	214.2	98.0
39	-10	-0098	Oct 06	02:50:04	11553	-25940	T+	pp	0.0660	2.7317	1.7419	329.4	214.9	98.8
40	-09	-0080	Oct 16	11:16:30	11358	-25717	T+	pp	0.0497	2.7642	1.7694	330.8	215.4	99.2
41	-08	-0062	Oct 27	19:49:52	11166	-25494	T+	pp	0.0396	2.7849	1.7855	332.1	215.9	99.4
42	-07	-0044	Nov 07	04:26:31	10976	-25271	T+	pp	0.0329	2.7994	1.7957	333.4	216.4	99.6
43	-06	-0026	Nov 18	13:06:38	10790	-25048	T+	pp	0.0299	2.8067	1.7994	334.7	216.8	99.7
44	-05	-0008	Nov 28	21:47:33	10606	-24825	T+	pp	0.0282	2.8115	1.8009	335.9	217.3	99.9
45	-04	0010	Dec 10	06:28:52	10424	-24602	T+	pp	0.0276	2.8139	1.8008	337.1	217.8	100.0
46	-03	0028	Dec 20	15:07:37	10244	-24379	T+	pp	0.0255	2.8189	1.8036	338.2	218.4	100.2
47	-02	0046	Dec 31	23:42:42	10067	-24156	T+	pp	0.0210	2.8279	1.8111	339.4	219.0	100.5
48	-01	0065	Jan 11	08:12:39	9890	-23933	T+	pp	0.0130	2.8432	1.8252	340.5	219.6	100.8
49	00	0083	Jan 22	16:36:21	9716	-23710	T+	pp	0.0008	2.8659	1.8472	341.6	220.3	101.1
50	01	0101	Feb 02	00:51:22	9542	-23487	T-	pp	-0.0181	2.8344	1.8153	342.7	220.9	101.3
51	02	0119	Feb 13	08:57:54	9369	-23264	T-	pp	-0.0433	2.7883	1.7689	343.7	221.4	101.3
52	03	0137	Feb 23	16:54:38	9197	-23041	T-	pp	-0.0757	2.7288	1.7093	344.5	221.7	100.7
53	04	0155	Mar 07	00:42:30	9026	-22818	T-	pp	-0.1147	2.6573	1.6377	345.1	221.6	99.2
54	05	0173	Mar 17	08:18:36	8855	-22595	T-	-p	-0.1624	2.5699	1.5501	345.4	220.9	96.2
55	06	0191	Mar 28	15:46:07	8684	-22372	T-	-p	-0.2164	2.4711	1.4509	345.1	219.3	91.0
56	07	0209	Apr 07	23:02:53	8513	-22149	T	-p	-0.2784	2.3577	1.3367	344.1	216.5	82.5
57	08	0227	Apr 19	06:12:14	8342	-21926	T	-h	-0.3455	2.2351	1.2132	342.3	212.3	68.8
58	09	0245	Apr 29	13:11:59	8170	-21703	T	-h	-0.4193	2.1003	1.0770	339.5	206.1	43.3
59	10	0263	May 10	20:06:35	7998	-21480	P	-t	-0.4964	1.9598	0.9346	335.5	197.8	-
60	11	0281	May 21	02:54:54	7825	-21257	P	-t	-0.5777	1.8119	0.7843	330.1	186.7	-
61	12	0299	Jun 01	09:39:17	7651	-21034	P	-t	-0.6611	1.6602	0.6298	323.3	172.2	-
62	13	0317	Jun 11	16:20:48	7477	-20811	P	-t	-0.7458	1.5065	0.4727	315.0	153.5	-
63	14	0335	Jun 22	23:01:25	7302	-20588	P	-t	-0.8303	1.3534	0.3159	305.2	128.9	-
64	15	0353	Jul 03	05:43:02	7125	-20365	P	-t	-0.9128	1.2041	0.1623	293.9	94.8	-

65	16	0371	Jul 14	12:25:32	6949 -20142	P	-t	-0.9935	1.0583	0.0119	281.0	26.3	-
66	17	0389	Jul 24	19:12:39	6771 -19919	N	-t	-1.0696	0.9212	-0.1302	267.1	-	-
67	18	0407	Aug 05	02:03:47	6593 -19696	N	-t	-1.1417	0.7917	-0.2650	251.8	-	-
68	19	0425	Aug 15	09:01:38	6415 -19473	N	-t	-1.2071	0.6744	-0.3878	236.0	-	-
69	20	0443	Aug 26	16:05:12	6236 -19250	N	-t	-1.2670	0.5671	-0.5006	219.5	-	-
70	21	0461	Sep 05	23:17:33	6058 -19027	N	-t	-1.3191	0.4745	-0.5988	203.3	-	-
71	22	0479	Sep 17	06:37:00	5881 -18804	N	-t	-1.3647	0.3935	-0.6852	187.1	-	-
72	23	0497	Sep 27	14:04:31	5705 -18581	N	-t	-1.4031	0.3256	-0.7583	171.8	-	-
73	24	0515	Oct 08	21:39:41	5527 -18358	N	-t	-1.4348	0.2700	-0.8188	157.7	-	-
74	25	0533	Oct 19	05:23:14	5351 -18135	N	-t	-1.4587	0.2283	-0.8649	145.9	-	-
75	26	0551	Oct 30	13:12:52	5176 -17912	N	-t	-1.4777	0.1955	-0.9016	135.7	-	-
76	27	0569	Nov 09	21:08:04	5003 -17689	N	-t	-1.4916	0.1715	-0.9288	127.6	-	-
77	28	0587	Nov 21	05:07:11	4831 -17466	N	-t	-1.5021	0.1535	-0.9492	121.1	-	-
78	29	0605	Dec 01	13:09:47	4660 -17243	N	-t	-1.5094	0.1410	-0.9634	116.4	-	-
79	30	0623	Dec 12	21:11:51	4490 -17020	N	-t	-1.5166	0.1281	-0.9771	111.1	-	-
80	31	0641	Dec 23	05:14:18	4322 -16797	N	-t	-1.5232	0.1160	-0.9893	105.9	-	-
81	32	0660	Jan 03	13:12:46	4155 -16574	N	-t	-1.5327	0.0983	-1.0062	97.7	-	-
82	33	0678	Jan 13	21:08:25	3991 -16351	N	-t	-1.5442	0.0764	-1.0266	86.3	-	-
83	34	0696	Jan 25	04:56:04	3828 -16128	N	-t	-1.5616	0.0434	-1.0574	65.2	-	-
84	35	0714	Feb 04	12:38:47	3667 -15905	Ne	-t	-1.5827	0.0032	-1.0947	17.9	-	-

SAROS SERIES

65

Saros series 65 contains 86 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-38	-0736 Aug 11	05:48:53	20782 -33833	Nb	a-	-1.5394	0.0260	-0.9596	44.8	-	-		
02	-37	-0718 Aug 22	13:34:08	20490 -33610	N	a-	-1.4999	0.1015	-0.8901	88.3	-	-		
03	-36	-0700 Sep 01	21:26:18	20199 -33387	N	a-	-1.4664	0.1662	-0.8317	112.8	-	-		
04	-35	-0682 Sep 13	05:26:36	19911 -33164	N	a-	-1.4399	0.2179	-0.7861	129.2	-	-		
05	-34	-0664 Sep 23	13:34:19	19625 -32941	N	a-	-1.4202	0.2570	-0.7531	140.4	-	-		
06	-33	-0646 Oct 04	21:47:51	19340 -32718	N	a-	-1.4059	0.2862	-0.7298	148.4	-	-		
07	-32	-0628 Oct 15	06:08:23	19058 -32495	N	a-	-1.3980	0.3036	-0.7180	153.2	-	-		
08	-31	-0610 Oct 26	14:33:31	18778 -32272	N	a-	-1.3943	0.3129	-0.7138	156.1	-	-		
09	-30	-0592 Nov 05	23:02:56	18500 -32049	N	a-	-1.3949	0.3142	-0.7171	157.0	-	-		
10	-29	-0574 Nov 17	07:33:31	18224 -31826	N	a-	-1.3971	0.3121	-0.7231	157.1	-	-		
11	-28	-0556 Nov 27	16:05:44	17950 -31603	N	a-	-1.4014	0.3060	-0.7326	156.2	-	-		
12	-27	-0538 Dec 09	00:36:08	17678 -31380	N	a-	-1.4049	0.3010	-0.7403	155.6	-	-		
13	-26	-0520 Dec 19	09:03:50	17408 -31157	N	h-	-1.4070	0.2981	-0.7452	155.4	-	-		
14	-25	-0502 Dec 30	17:26:31	17141 -30934	N	h-	-1.4057	0.3013	-0.7436	156.7	-	-		
15	-24	-0483 Jan 10	01:43:36	16823 -30711	N	h-	-1.4005	0.3113	-0.7346	159.7	-	-		
16	-23	-0465 Jan 21	09:52:13	16512 -30488	N	h-	-1.3894	0.3320	-0.7145	165.1	-	-		

17	-22	-0447	Jan 31	17:52:27	16209	-30265	N	t-	-1.3721	0.3637	-0.6829	172.8	-	-
18	-21	-0429	Feb 12	01:42:45	15915	-30042	N	t-	-1.3477	0.4086	-0.6380	183.0	-	-
19	-20	-0411	Feb 22	09:23:50	15628	-29819	N	t-	-1.3162	0.4662	-0.5803	195.0	-	-
20	-19	-0393	Mar 05	16:52:34	15349	-29596	N	t-	-1.2758	0.5404	-0.5059	209.1	-	-
21	-18	-0375	Mar 16	00:12:15	15076	-29373	N	t-	-1.2287	0.6267	-0.4195	223.9	-	-
22	-17	-0357	Mar 27	07:20:30	14810	-29150	N	t-	-1.1732	0.7286	-0.3176	239.8	-	-
23	-16	-0339	Apr 06	14:21:18	14551	-28927	N	t-	-1.1119	0.8410	-0.2054	255.5	-	-
24	-15	-0321	Apr 17	21:10:46	14297	-28704	N	t-	-1.0423	0.9690	-0.0780	271.4	-	-
25	-14	-0303	Apr 28	03:55:20	14049	-28481	P	t-	-0.9692	1.1037	0.0557	286.4	56.7	-
26	-13	-0285	May 09	10:31:36	13806	-28258	P	t-	-0.8903	1.2492	0.1999	300.8	105.5	-
27	-12	-0267	May 19	17:04:41	13569	-28035	P	t-	-0.8091	1.3990	0.3481	314.0	136.5	-
28	-11	-0249	May 30	23:32:31	13336	-27812	P	t-	-0.7239	1.5564	0.5033	326.1	160.6	-
29	-10	-0231	Jun 10	06:00:41	13108	-27589	P	t-	-0.6394	1.7127	0.6570	336.7	179.4	-
30	-09	-0213	Jun 21	12:27:52	12885	-27366	P	t-	-0.5546	1.8698	0.8111	345.9	194.5	-
31	-08	-0195	Jul 01	18:56:57	12666	-27143	P	t-	-0.4717	2.0237	0.9616	353.7	206.5	-
32	-07	-0177	Jul 13	01:29:07	12451	-26920	T	t-	-0.3917	2.1723	1.1065	360.1	215.8	52.2
33	-06	-0159	Jul 23	08:06:45	12240	-26697	T	tp	-0.3167	2.3121	1.2423	365.2	222.7	75.2
34	-05	-0141	Aug 03	14:50:16	12033	-26474	T-	pp	-0.2464	2.4431	1.3691	369.3	227.8	88.5
35	-04	-0123	Aug 13	21:40:31	11830	-26251	T-	pp	-0.1821	2.5633	1.4850	372.3	231.3	96.8
36	-03	-0105	Aug 25	04:39:15	11631	-26028	T-	pp	-0.1251	2.6702	1.5874	374.5	233.6	101.6
37	-02	-0087	Sep 04	11:46:44	11434	-25805	T-	pp	-0.0756	2.7632	1.6761	376.1	234.8	104.2
38	-01	-0069	Sep 15	19:02:34	11241	-25582	T-	pp	-0.0332	2.8431	1.7519	377.2	235.4	105.3
39	00	-0051	Sep 26	02:27:51	11051	-25359	T+	pp	0.0014	2.9033	1.8083	377.9	235.5	105.5
40	01	-0033	Oct 07	10:01:57	10863	-25136	T+	pp	0.0288	2.8548	1.7563	378.3	235.4	105.1
41	02	-0015	Oct 17	17:44:37	10678	-24913	T+	pp	0.0489	2.8194	1.7181	378.6	235.1	104.5
42	03	0003	Oct 29	01:32:40	10496	-24690	T+	pp	0.0645	2.7919	1.6883	378.7	234.8	103.9
43	04	0021	Nov 08	09:27:47	10315	-24467	T+	pp	0.0745	2.7744	1.6692	378.8	234.6	103.5
44	05	0039	Nov 19	17:26:37	10137	-24244	T+	pp	0.0817	2.7615	1.6555	378.6	234.3	103.1

45	06	0057 Nov 30 01:28:26	9960 -24021	T+ pp	0.0867	2.7524	1.6464	378.4	234.1	102.8
46	07	0075 Dec 11 09:30:03	9784 -23798	T+ pp	0.0920	2.7421	1.6369	378.0	233.9	102.5
47	08	0093 Dec 21 17:31:38	9610 -23575	T+ pp	0.0978	2.7306	1.6271	377.4	233.6	102.2
48	09	0112 Jan 02 01:30:20	9437 -23352	T+ pp	0.1064	2.7137	1.6126	376.6	233.3	101.7
49	10	0130 Jan 12 09:24:15	9265 -23129	T+ pp	0.1193	2.6883	1.5905	375.6	232.8	101.0
50	11	0148 Jan 23 17:12:45	9094 -22906	T+ pp	0.1372	2.6536	1.5596	374.4	232.0	99.8
51	12	0166 Feb 03 00:54:18	8922 -22683	T+ pp	0.1612	2.6075	1.5178	372.8	231.0	97.9
52	13	0184 Feb 14 08:28:06	8751 -22460	T+ pp	0.1918	2.5487	1.4639	370.9	229.5	94.8
53	14	0202 Feb 24 15:53:20	8580 -22237	T+ pp	0.2301	2.4759	1.3963	368.4	227.3	90.1
54	15	0220 Mar 06 23:10:55	8409 -22014	T pp	0.2751	2.3906	1.3164	365.4	224.3	83.0
55	16	0238 Mar 18 06:20:14	8238 -21791	T -p	0.3274	2.2919	1.2232	361.6	220.1	72.1
56	17	0256 Mar 28 13:21:07	8066 -21568	T -t	0.3871	2.1796	1.1163	356.9	214.4	53.9
57	18	0274 Apr 08 20:15:43	7893 -21345	P -t	0.4523	2.0572	0.9993	351.2	207.1	-
58	19	0292 Apr 19 03:04:17	7720 -21122	P -t	0.5230	1.9249	0.8721	344.4	197.6	-
59	20	0310 Apr 30 09:49:20	7546 -20899	P -t	0.5974	1.7859	0.7380	336.3	185.6	-
60	21	0328 May 10 16:29:40	7371 -20676	P -t	0.6762	1.6391	0.5957	326.8	170.3	-
61	22	0346 May 21 23:10:10	7195 -20453	P -t	0.7555	1.4915	0.4522	316.0	151.3	-
62	23	0364 Jun 01 05:49:18	7018 -20230	P -t	0.8362	1.3415	0.3059	303.7	126.9	-
63	24	0382 Jun 12 12:30:29	6841 -20007	P -t	0.9160	1.1934	0.1611	290.1	93.7	-
64	25	0400 Jun 22 19:13:43	6663 -19784	P -t	0.9949	1.0474	0.0177	275.0	31.6	-
65	26	0418 Jul 04 02:02:17	6485 -19561	N -t	1.0700	0.9083	-0.1191	258.9	-	-
66	27	0436 Jul 14 08:56:32	6306 -19338	N -t	1.1410	0.7773	-0.2485	241.8	-	-
67	28	0454 Jul 25 15:56:55	6128 -19115	N -t	1.2076	0.6543	-0.3700	223.7	-	-
68	29	0472 Aug 04 23:06:07	5951 -18892	N -t	1.2677	0.5436	-0.4798	205.4	-	-
69	30	0490 Aug 16 06:23:31	5774 -18669	N -t	1.3217	0.4442	-0.5785	186.8	-	-
70	31	0508 Aug 26 13:51:10	5597 -18446	N -h	1.3683	0.3585	-0.6639	168.6	-	-
71	32	0526 Sep 06 21:27:13	5421 -18223	N -h	1.4087	0.2843	-0.7379	150.7	-	-
72	33	0544 Sep 17 05:14:51	5245 -18000	N -h	1.4406	0.2256	-0.7965	134.5	-	-

73	34	0562	Sep 28	13:11:14	5071 -17777	N	-a	1.4663	0.1785	-0.8435	119.8	-	-
74	35	0580	Oct 08	21:17:59	4898 -17554	N	-a	1.4847	0.1446	-0.8771	107.8	-	-
75	36	0598	Oct 20	05:32:42	4727 -17331	N	-a	1.4976	0.1206	-0.9006	98.3	-	-
76	37	0616	Oct 30	13:56:41	4557 -17108	N	-a	1.5043	0.1080	-0.9124	92.8	-	-
77	38	0634	Nov 10	22:26:12	4388 -16885	N	-a	1.5072	0.1020	-0.9171	90.0	-	-
78	39	0652	Nov 21	07:01:04	4221 -16662	N	-a	1.5069	0.1017	-0.9158	89.6	-	-
79	40	0670	Dec 02	15:39:13	4055 -16439	N	-a	1.5049	0.1043	-0.9109	90.4	-	-
80	41	0688	Dec 13	00:20:13	3892 -16216	N	-a	1.5017	0.1087	-0.9038	91.9	-	-
81	42	0706	Dec 24	08:59:57	3731 -15993	N	-a	1.5002	0.1097	-0.8994	92.1	-	-
82	43	0725	Jan 03	17:38:46	3571 -15770	N	-a	1.5002	0.1079	-0.8975	91.0	-	-
83	44	0743	Jan 15	02:13:37	3415 -15547	N	-a	1.5041	0.0986	-0.9024	86.8	-	-
84	45	0761	Jan 25	10:45:27	3261 -15324	N	-a	1.5111	0.0834	-0.9129	79.6	-	-
85	46	0779	Feb 05	19:09:30	3110 -15101	N	-a	1.5249	0.0555	-0.9359	64.9	-	-
86	47	0797	Feb 16	03:29:04	2962 -14878	Ne	-a	1.5430	0.0196	-0.9666	38.5	-	-

SAROS SERIES

66

Saros series 66 contains 84 lunar eclipses.

													PHASE	
													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-35	-0671 Aug 12	09:59:52	19737 -33029	Nb t-	1.5751	0.0092	-1.0729	30.0	-	-			
02	-34	-0653 Aug 23	16:59:48	19452 -32806	N t-	1.5206	0.1107	-0.9744	103.0	-	-			
03	-33	-0635 Sep 03	00:10:06	19169 -32583	N t-	1.4737	0.1981	-0.8898	136.7	-	-			
04	-32	-0617 Sep 14	07:29:50	18888 -32360	N t-	1.4338	0.2726	-0.8179	159.3	-	-			
05	-31	-0599 Sep 24	15:00:04	18609 -32137	N t-	1.4016	0.3330	-0.7598	175.0	-	-			
06	-30	-0581 Oct 05	22:39:23	18333 -31914	N t-	1.3760	0.3809	-0.7138	186.2	-	-			
07	-29	-0563 Oct 16	06:26:13	18058 -31691	N t-	1.3559	0.4183	-0.6777	194.3	-	-			
08	-28	-0545 Oct 27	14:21:12	17785 -31468	N t-	1.3418	0.4447	-0.6521	199.6	-	-			
09	-27	-0527 Nov 06	22:21:34	17515 -31245	N t-	1.3319	0.4628	-0.6339	203.0	-	-			
10	-26	-0509 Nov 18	06:26:56	17246 -31022	N t-	1.3250	0.4751	-0.6209	205.1	-	-			
11	-25	-0491 Nov 28	14:33:06	16949 -30799	N t-	1.3183	0.4867	-0.6078	206.9	-	-			
12	-24	-0473 Dec 09	22:41:44	16634 -30576	N t-	1.3128	0.4954	-0.5967	208.1	-	-			
13	-23	-0455 Dec 20	06:48:18	16328 -30353	N t-	1.3054	0.5075	-0.5815	209.8	-	-			
14	-22	-0437 Dec 31	14:52:27	16030 -30130	N h-	1.2952	0.5242	-0.5608	212.3	-	-			
15	-21	-0418 Jan 10	22:51:19	15741 -29907	N h-	1.2803	0.5493	-0.5312	216.1	-	-			
16	-20	-0400 Jan 22	06:45:29	15458 -29684	N h-	1.2607	0.5826	-0.4927	221.0	-	-			
17	-19	-0382 Feb 01	14:32:26	15183 -29461	N h-	1.2347	0.6276	-0.4421	227.5	-	-			
18	-18	-0364 Feb 12	22:12:10	14915 -29238	N h-	1.2021	0.6842	-0.3795	235.3	-	-			
19	-17	-0346 Feb 23	05:44:02	14653 -29015	N h-	1.1624	0.7541	-0.3034	244.3	-	-			
20	-16	-0328 Mar 05	13:08:44	14396 -28792	N h-	1.1160	0.8360	-0.2152	254.0	-	-			
21	-15	-0310 Mar 16	20:24:55	14146 -28569	N h-	1.0618	0.9322	-0.1125	264.4	-	-			
22	-14	-0292 Mar 27	03:35:05	13901 -28346	P h-	1.0016	1.0395	0.0010	274.8	7.5	-			
23	-13	-0274 Apr 07	10:38:43	13662 -28123	P h-	0.9349	1.1587	0.1263	285.1	82.9	-			

24	-12	-0256	Apr 17	17:38:51	13427	-27900	P	h-	0.8644	1.2853	0.2586	294.7	116.0	-
25	-11	-0238	Apr 29	00:33:17	13197	-27677	P	h-	0.7878	1.4232	0.4019	303.8	141.1	-
26	-10	-0220	May 09	07:27:25	12972	-27454	P	h-	0.7097	1.5640	0.5475	311.8	160.4	-
27	-09	-0202	May 20	14:18:45	12752	-27231	P	h-	0.6278	1.7121	0.7001	318.9	176.4	-
28	-08	-0184	May 30	21:12:42	12535	-27008	P	h-	0.5469	1.8585	0.8504	324.6	188.8	-
29	-07	-0166	Jun 11	04:06:18	12323	-26785	T	a-	0.4645	2.0081	1.0034	329.3	198.8	9.1
30	-06	-0148	Jun 21	11:05:52	12115	-26562	T	a-	0.3856	2.1513	1.1494	332.8	206.3	58.1
31	-05	-0130	Jul 02	18:08:36	11910	-26339	T	a-	0.3081	2.2925	1.2928	335.3	211.9	77.3
32	-04	-0112	Jul 13	01:18:25	11709	-26116	T+	p-	0.2353	2.4251	1.4271	336.8	215.6	88.6
33	-03	-0094	Jul 24	08:34:17	11511	-25893	T+	p-	0.1667	2.5505	1.5538	337.4	218.0	95.5
34	-02	-0076	Aug 03	15:59:09	11317	-25670	T+	pp	0.1046	2.6640	1.6681	337.4	219.1	99.3
35	-01	-0058	Aug 14	23:32:16	11126	-25447	T+	pp	0.0484	2.7669	1.7714	336.9	219.3	101.0
36	00	-0040	Aug 25	07:14:21	10937	-25224	T-	pp	-0.0012	2.8533	1.8580	335.9	218.9	101.2
37	01	-0022	Sep 05	15:06:11	10751	-25001	T-	pp	-0.0435	2.7758	1.7804	334.8	218.0	100.5
38	02	-0004	Sep 15	23:07:42	10567	-24778	T-	pp	-0.0784	2.7117	1.7163	333.5	216.9	99.2
39	03	0014	Sep 27	07:18:39	10386	-24555	T-	pp	-0.1062	2.6608	1.6652	332.2	215.7	97.7
40	04	0032	Oct 07	15:38:15	10207	-24332	T-	pp	-0.1274	2.6220	1.6263	331.0	214.6	96.3
41	05	0050	Oct 19	00:06:10	10029	-24109	T-	p	-0.1426	2.5940	1.5985	329.8	213.6	95.1
42	06	0068	Oct 29	08:41:07	9853	-23886	T-	p	-0.1525	2.5756	1.5806	328.8	212.8	94.1
43	07	0086	Nov 09	17:21:11	9679	-23663	T-	p	-0.1588	2.5636	1.5695	327.8	212.1	93.5
44	08	0104	Nov 20	02:06:11	9505	-23440	T-	p	-0.1616	2.5579	1.5650	326.8	211.6	93.1
45	09	0122	Dec 01	10:53:36	9333	-23217	T-	p	-0.1626	2.5552	1.5640	325.9	211.2	92.9
46	10	0140	Dec 11	19:42:12	9161	-22994	T-	p	-0.1633	2.5528	1.5639	325.0	210.8	92.8
47	11	0158	Dec 23	04:29:10	8990	-22771	T-	p	-0.1659	2.5466	1.5604	324.1	210.4	92.6
48	12	0177	Jan 02	13:14:26	8819	-22548	T-	p	-0.1701	2.5373	1.5543	323.1	209.9	92.2
49	13	0195	Jan 13	21:55:51	8648	-22325	T-	p	-0.1777	2.5215	1.5420	322.0	209.4	91.6
50	14	0213	Jan 24	06:31:27	8477	-22102	T-	p	-0.1906	2.4959	1.5204	320.8	208.7	90.5
51	15	0231	Feb 04	15:00:59	8306	-21879	T-	p	-0.2087	2.4606	1.4892	319.4	207.8	88.8

52	16	0249 Feb 14	23:23:23	8134 -21656	T-	-p	-0.2332	2.4136	1.4464	317.8	206.5	86.3
53	17	0267 Feb 26	07:38:57	7961 -21433	T-	-p	-0.2635	2.3557	1.3928	316.0	204.8	82.6
54	18	0285 Mar 08	15:45:39	7788 -21210	T	-p	-0.3015	2.2839	1.3252	313.8	202.4	77.0
55	19	0303 Mar 19	23:45:52	7615 -20987	T	-p	-0.3453	2.2016	1.2468	311.2	199.4	68.8
56	20	0321 Mar 30	07:38:17	7440 -20764	T	-p	-0.3959	2.1068	1.1557	307.9	195.3	56.3
57	21	0339 Apr 10	15:24:31	7265 -20541	T	-a	-0.4520	2.0022	1.0544	304.1	190.0	34.3
58	22	0357 Apr 20	23:04:20	7088 -20318	P	-a	-0.5138	1.8874	0.9424	299.5	183.2	-
59	23	0375 May 02	06:39:57	6911 -20095	P	-a	-0.5794	1.7659	0.8231	294.0	174.8	-
60	24	0393 May 12	14:11:45	6734 -19872	P	-a	-0.6484	1.6386	0.6974	287.6	164.2	-
61	25	0411 May 23	21:39:55	6555 -19649	P	-a	-0.7205	1.5056	0.5655	280.1	151.0	-
62	26	0429 Jun 03	05:07:01	6377 -19426	P	-a	-0.7936	1.3714	0.4316	271.6	134.7	-
63	27	0447 Jun 14	12:33:07	6199 -19203	P	-a	-0.8677	1.2356	0.2955	262.0	113.7	-
64	28	0465 Jun 24	20:00:37	6021 -18980	P	-a	-0.9402	1.1030	0.1619	251.4	85.8	-
65	29	0483 Jul 06	03:28:49	5844 -18757	P	-a	-1.0120	0.9721	0.0293	239.6	37.2	-
66	30	0501 Jul 16	11:01:18	5667 -18534	N	-a	-1.0801	0.8482	-0.0968	227.0	-	-
67	31	0519 Jul 27	18:37:31	5490 -18311	N	-a	-1.1451	0.7305	-0.2174	213.6	-	-
68	32	0537 Aug 07	02:18:44	5314 -18088	N	-a	-1.2056	0.6212	-0.3300	199.5	-	-
69	33	0555 Aug 18	10:05:54	5140 -17865	N	-a	-1.2609	0.5216	-0.4335	185.0	-	-
70	34	0573 Aug 28	17:59:54	4966 -17642	N	-a	-1.3104	0.4329	-0.5263	170.3	-	-
71	35	0591 Sep 09	02:01:43	4794 -17419	N	-a	-1.3534	0.3561	-0.6075	156.0	-	-
72	36	0609 Sep 19	10:09:43	4624 -17196	N	-a	-1.3914	0.2887	-0.6794	141.7	-	-
73	37	0627 Sep 30	18:26:31	4454 -16973	N	-a	-1.4220	0.2350	-0.7378	128.8	-	-
74	38	0645 Oct 11	02:49:50	4287 -16750	N	-a	-1.4472	0.1910	-0.7862	116.9	-	-
75	39	0663 Oct 22	11:20:57	4120 -16527	N	-a	-1.4659	0.1588	-0.8228	107.2	-	-
76	40	0681 Nov 01	19:56:27	3956 -16304	N	-a	-1.4810	0.1332	-0.8525	98.7	-	-
77	41	0699 Nov 13	04:37:54	3794 -16081	N	-a	-1.4911	0.1165	-0.8729	92.7	-	-
78	42	0717 Nov 23	13:21:42	3634 -15858	N	-a	-1.4991	0.1034	-0.8893	87.7	-	-
79	43	0735 Dec 04	22:07:43	3476 -15635	N	-a	-1.5049	0.0943	-0.9012	84.0	-	-

80	44	0753	Dec 15	06:53:21	3321	-15412	N	-a	-1.5106	0.0849	-0.9129	80.0	-	-
81	45	0771	Dec 26	15:38:15	3169	-15189	N	-a	-1.5164	0.0754	-0.9243	75.7	-	-
82	46	0790	Jan 06	00:19:09	3020	-14966	N	-a	-1.5250	0.0601	-0.9409	67.9	-	-
83	47	0808	Jan 17	08:55:34	2874	-14743	N	-a	-1.5369	0.0388	-0.9631	54.8	-	-
84	48	0826	Jan 27	17:25:25	2731	-14520	Ne	-a	-1.5533	0.0089	-0.9935	26.4	-	-

SAROS SERIES

67

Saros series 67 contains 73 lunar eclipses.

													PHASE	
													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-37	-0660 Jul 11	19:40:20	19564 -32894	Nb	a-	-1.5130	0.0681	-0.9050	71.7	-	-		
02	-36	-0642 Jul 23	03:09:50	19281 -32671	N	a-	-1.4476	0.1880	-0.7847	117.5	-	-		
03	-35	-0624 Aug 02	10:47:04	18999 -32448	N	a-	-1.3878	0.2975	-0.6750	145.9	-	-		
04	-34	-0606 Aug 13	18:32:09	18719 -32225	N	a-	-1.3340	0.3965	-0.5763	166.5	-	-		

05	-33	-0588	Aug 24	02:26:30	18441	-32002	N	a-	-1.2871	0.4828	-0.4906	181.8	-	-
06	-32	-0570	Sep 04	10:30:12	18166	-31779	N	a-	-1.2473	0.5561	-0.4180	193.3	-	-
07	-31	-0552	Sep 14	18:43:09	17892	-31556	N	a-	-1.2149	0.6161	-0.3589	201.9	-	-
08	-30	-0534	Sep 26	03:04:05	17621	-31333	N	a-	-1.1886	0.6648	-0.3111	208.3	-	-
09	-29	-0516	Oct 06	11:33:32	17352	-31110	N	a-	-1.1692	0.7009	-0.2759	212.8	-	-
10	-28	-0498	Oct 17	20:10:28	17075	-30887	N	a-	-1.1554	0.7264	-0.2510	215.7	-	-
11	-27	-0480	Oct 28	04:53:04	16757	-30664	N	a-	-1.1461	0.7437	-0.2339	217.6	-	-
12	-26	-0462	Nov 08	13:41:02	16447	-30441	N	a-	-1.1409	0.7532	-0.2244	218.4	-	-
13	-25	-0444	Nov 18	22:31:49	16147	-30218	N	a-	-1.1376	0.7589	-0.2181	218.8	-	-
14	-24	-0426	Nov 30	07:25:15	15854	-29995	N	a-	-1.1366	0.7604	-0.2158	218.7	-	-
15	-23	-0408	Dec 10	16:17:01	15569	-29772	N	a-	-1.1340	0.7644	-0.2102	218.9	-	-
16	-22	-0390	Dec 22	01:08:45	15291	-29549	N	a-	-1.1313	0.7684	-0.2044	219.1	-	-
17	-21	-0371	Jan 01	09:56:06	15020	-29326	N	a-	-1.1247	0.7794	-0.1912	220.2	-	-
18	-20	-0353	Jan 12	18:39:29	14755	-29103	N	a-	-1.1151	0.7956	-0.1724	221.8	-	-
19	-19	-0335	Jan 23	03:15:31	14497	-28880	N	a-	-1.0996	0.8226	-0.1425	224.7	-	-
20	-18	-0317	Feb 03	11:46:02	14244	-28657	N	a-	-1.0797	0.8576	-0.1045	228.4	-	-
21	-17	-0299	Feb 13	20:08:15	13997	-28434	N	a-	-1.0530	0.9051	-0.0540	233.3	-	-
22	-16	-0281	Feb 25	04:22:31	13756	-28211	P	a-	-1.0199	0.9643	0.0083	239.1	19.8	-
23	-15	-0263	Mar 07	12:28:13	13519	-27988	P	a-	-0.9799	1.0363	0.0831	245.9	62.1	-
24	-14	-0245	Mar 18	20:26:41	13287	-27765	P	a-	-0.9340	1.1192	0.1686	253.1	87.4	-
25	-13	-0227	Mar 29	04:17:04	13061	-27542	P	a-	-0.8816	1.2142	0.2659	260.9	108.3	-
26	-12	-0209	Apr 09	12:00:38	12838	-27319	P	a-	-0.8234	1.3201	0.3735	268.8	126.5	-
27	-11	-0191	Apr 19	19:38:06	12620	-27096	P	a-	-0.7603	1.4352	0.4899	276.7	142.5	-
28	-10	-0173	May 01	03:10:54	12406	-26873	P	a-	-0.6935	1.5575	0.6128	284.3	156.5	-
29	-09	-0155	May 11	10:38:15	12196	-26650	P	a-	-0.6223	1.6880	0.7435	291.6	169.0	-
30	-08	-0137	May 22	18:03:37	11990	-26427	P	a-	-0.5496	1.8219	0.8767	298.2	179.6	-
31	-07	-0119	Jun 02	01:26:17	11788	-26204	T	a-	-0.4751	1.9591	1.0126	304.2	188.7	16.8

32	-06	-0101	Jun 13	08:49:48	11589	-25981	T	a-	-0.4015	2.0951	1.1468	309.4	196.2	55.2
33	-05	-0083	Jun 23	16:11:50	11393	-25758	T	p-	-0.3273	2.2327	1.2817	314.0	202.3	73.3
34	-04	-0065	Jul 04	23:37:55	11201	-25535	T-	p-	-0.2570	2.3632	1.4090	317.7	207.0	84.6
35	-03	-0047	Jul 15	07:05:20	11011	-25312	T-	p-	-0.1887	2.4905	1.5325	320.9	210.5	92.1
36	-02	-0029	Jul 26	14:38:10	10824	-25089	T-	pp	-0.1254	2.6089	1.6465	323.3	212.9	96.7
37	-01	-0011	Aug 05	22:14:21	10640	-24866	T-	pp	-0.0656	2.7210	1.7539	325.3	214.4	99.3
38	00	0007	Aug 17	05:58:18	10457	-24643	T-	pp	-0.0129	2.8203	1.8479	326.9	215.2	100.2
39	01	0025	Aug 27	13:47:51	10277	-24420	T+	pp	0.0341	2.7841	1.8063	328.2	215.4	100.0
40	02	0043	Sep 07	21:44:44	10099	-24197	T+	pp	0.0744	2.7130	1.7296	329.3	215.3	99.0
41	03	0061	Sep 18	05:48:54	9923	-23974	T+	-p	0.1081	2.6542	1.6650	330.3	215.1	97.5
42	04	0079	Sep 29	14:01:11	9748	-23751	T+	-p	0.1346	2.6084	1.6136	331.3	214.8	96.0
43	05	0097	Oct 09	22:20:04	9574	-23528	T+	-p	0.1548	2.5741	1.5739	332.3	214.5	94.6
44	06	0115	Oct 21	06:44:43	9401	-23305	T+	-p	0.1697	2.5494	1.5439	333.4	214.4	93.4
45	07	0133	Oct 31	15:15:03	9229	-23082	T+	-p	0.1791	2.5346	1.5243	334.6	214.5	92.6
46	08	0151	Nov 11	23:49:40	9057	-22859	T+	-p	0.1847	2.5265	1.5118	335.8	214.7	92.1
47	09	0169	Nov 22	08:26:30	8886	-22636	T+	-p	0.1877	2.5229	1.5044	337.0	215.1	91.9
48	10	0187	Dec 03	17:04:34	8715	-22413	T+	-p	0.1893	2.5217	1.4999	338.3	215.5	91.8
49	11	0205	Dec 14	01:41:42	8544	-22190	T+	-p	0.1909	2.5200	1.4955	339.5	216.0	91.8
50	12	0223	Dec 25	10:16:37	8373	-21967	T+	-p	0.1937	2.5160	1.4894	340.6	216.4	91.6
51	13	0242	Jan 04	18:46:22	8202	-21744	T+	-p	0.2001	2.5051	1.4769	341.6	216.8	91.2
52	14	0260	Jan 16	03:11:11	8030	-21521	T+	-p	0.2100	2.4875	1.4582	342.5	216.9	90.3
53	15	0278	Jan 26	11:28:31	7857	-21298	T+	-p	0.2255	2.4594	1.4294	343.2	216.8	88.7
54	16	0296	Feb 06	19:37:21	7683	-21075	T+	-p	0.2472	2.4196	1.3892	343.5	216.3	86.0
55	17	0314	Feb 17	03:36:44	7509	-20852	T	-p	0.2761	2.3669	1.3362	343.6	215.2	81.8
56	18	0332	Feb 28	11:26:32	7334	-20629	T	-a	0.3121	2.3008	1.2701	343.1	213.5	75.4
57	19	0350	Mar 10	19:06:45	7158	-20406	T	-a	0.3554	2.2213	1.1905	342.1	210.7	65.2
58	20	0368	Mar 21	02:35:36	6981	-20183	T	-a	0.4073	2.1262	1.0953	340.3	206.6	47.7
59	21	0386	Apr 01	09:55:38	6804	-19960	P	-h	0.4656	2.0195	0.9881	337.7	200.9	-

60	22	0404 Apr 11	17:05:42	6626 -19737	P	-t	0.5310	1.8997	0.8678	333.9	193.1	-
61	23	0422 Apr 23	00:08:11	6447 -19514	P	-t	0.6018	1.7703	0.7374	328.8	182.6	-
62	24	0440 May 03	07:01:41	6269 -19291	P	-t	0.6790	1.6292	0.5951	322.1	168.5	-
63	25	0458 May 14	13:50:08	6091 -19068	P	-t	0.7592	1.4830	0.4471	313.9	150.0	-
64	26	0476 May 24	20:32:20	5913 -18845	P	-t	0.8431	1.3302	0.2921	303.6	124.5	-
65	27	0494 Jun 05	03:11:03	5737 -18622	P	-t	0.9285	1.1747	0.1340	291.4	86.5	-
66	28	0512 Jun 15	09:47:02	5560 -18399	Nx	-t	1.0151	1.0175	-0.0264	276.8	-	-
67	29	0530 Jun 26	16:23:02	5384 -18176	N	-t	1.1001	0.8632	-0.1842	260.0	-	-
68	30	0548 Jul 06	22:59:59	5208 -17953	N	-t	1.1833	0.7126	-0.3387	240.7	-	-
69	31	0566 Jul 18	05:38:45	5035 -17730	N	-t	1.2637	0.5673	-0.4884	218.6	-	-
70	32	0584 Jul 28	12:22:13	4862 -17507	N	-t	1.3390	0.4314	-0.6290	193.7	-	-
71	33	0602 Aug 08	19:10:29	4691 -17284	N	-t	1.4094	0.3048	-0.7605	165.3	-	-
72	34	0620 Aug 19	02:05:18	4521 -17061	N	-t	1.4737	0.1893	-0.8809	132.1	-	-
73	35	0638 Aug 30	09:07:10	4353 -16838	N	-t	1.5314	0.0859	-0.9895	90.1	-	-

SAROS SERIES

68

Saros series 68 contains 72 lunar eclipses.

PHASE													
DURATIONS													
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-36	-0595 Jul 14 02:24:19	18551 -32090	N	a-	1.4981	0.0988	-0.8809	86.8	-	-	-	-
02	-35	-0577 Jul 25 09:47:47	18274 -31867	N	a-	1.4410	0.2064	-0.7789	124.8	-	-	-	-
03	-34	-0559 Aug 04 17:17:31	18000 -31644	N	h-	1.3894	0.3040	-0.6871	150.8	-	-	-	-
04	-33	-0541 Aug 16 00:52:44	17728 -31421	N	h-	1.3426	0.3930	-0.6043	170.8	-	-	-	-
05	-32	-0523 Aug 26 08:35:01	17458 -31198	N	h-	1.3023	0.4701	-0.5336	186.3	-	-	-	-
06	-31	-0505 Sep 06 16:24:10	17190 -30975	N	h-	1.2682	0.5360	-0.4740	198.6	-	-	-	-
07	-30	-0487 Sep 17 00:21:24	16881 -30752	N	h-	1.2412	0.5887	-0.4277	208.0	-	-	-	-
08	-29	-0469 Sep 28 08:25:24	16568 -30529	N	h-	1.2202	0.6305	-0.3922	215.3	-	-	-	-
09	-28	-0451 Oct 08 16:35:47	16264 -30306	N	h-	1.2048	0.6616	-0.3671	220.9	-	-	-	-
10	-27	-0433 Oct 20 00:52:16	15968 -30083	N	h-	1.1951	0.6823	-0.3520	224.8	-	-	-	-
11	-26	-0415 Oct 30 09:14:17	15680 -29860	N	h-	1.1908	0.6927	-0.3466	227.3	-	-	-	-
12	-25	-0397 Nov 10 17:39:09	15400 -29637	N	h-	1.1892	0.6979	-0.3459	228.9	-	-	-	-
13	-24	-0379 Nov 21 02:06:22	15126 -29414	N	h-	1.1904	0.6978	-0.3499	229.8	-	-	-	-
14	-23	-0361 Dec 02 10:33:18	14859 -29191	N	h-	1.1920	0.6963	-0.3545	230.4	-	-	-	-
15	-22	-0343 Dec 12 18:59:43	14598 -28968	N	h-	1.1940	0.6939	-0.3595	230.9	-	-	-	-
16	-21	-0325 Dec 24 03:21:03	14343 -28745	N	h-	1.1931	0.6966	-0.3586	232.1	-	-	-	-
17	-20	-0306 Jan 03 11:38:53	14094 -28522	N	h-	1.1901	0.7028	-0.3538	233.7	-	-	-	-
18	-19	-0288 Jan 14 19:48:28	13850 -28299	N	t-	1.1814	0.7191	-0.3383	236.7	-	-	-	-
19	-18	-0270 Jan 25 03:51:37	13612 -28076	N	t-	1.1683	0.7433	-0.3143	240.8	-	-	-	-
20	-17	-0252 Feb 05 11:43:40	13378 -27853	N	t-	1.1471	0.7822	-0.2754	246.8	-	-	-	-
21	-16	-0234 Feb 15 19:27:50	13150 -27630	N	t-	1.1203	0.8312	-0.2260	253.8	-	-	-	-
22	-15	-0216 Feb 27 03:00:15	12925 -27407	N	t-	1.0849	0.8958	-0.1610	262.5	-	-	-	-
23	-14	-0198 Mar 09 10:22:54	12706 -27184	N	t-	1.0422	0.9740	-0.0823	272.2	-	-	-	-

24	-13	-0180	Mar 19	17:34:12	12490	-26961	P	t-	0.9908	1.0682	0.0122	283.0	26.7	-
25	-12	-0162	Mar 31	00:36:58	12279	-26738	P	t-	0.9330	1.1741	0.1185	294.1	82.0	-
26	-11	-0144	Apr 10	07:30:07	12071	-26515	P	t-	0.8678	1.2936	0.2380	305.4	114.5	-
27	-10	-0126	Apr 21	14:14:55	11867	-26292	P	t-	0.7965	1.4246	0.3689	316.5	140.2	-
28	-09	-0108	May 01	20:52:28	11667	-26069	P	t-	0.7195	1.5661	0.5098	327.2	161.6	-
29	-08	-0090	May 13	03:24:45	11470	-25846	P	t-	0.6385	1.7152	0.6580	337.1	179.6	-
30	-07	-0072	May 23	09:52:19	11276	-25623	P	t-	0.5541	1.8707	0.8123	346.1	194.7	-
31	-06	-0054	Jun 03	16:17:18	11086	-25400	P	t-	0.4680	2.0296	0.9694	353.9	207.1	-
32	-05	-0036	Jun 13	22:41:22	10897	-25177	T	t-	0.3813	2.1897	1.1274	360.5	217.1	56.7
33	-04	-0018	Jun 25	05:06:46	10712	-24954	T	pp	0.2960	2.3475	1.2826	365.8	224.6	80.2
34	-03	0000	Jul 05	11:33:06	10529	-24731	T+	pp	0.2117	2.5037	1.4360	369.9	230.1	93.9
35	-02	0018	Jul 16	18:04:17	10348	-24508	T+	pp	0.1315	2.6524	1.5814	372.7	233.6	101.7
36	-01	0036	Jul 27	00:39:47	10169	-24285	T+	pp	0.0551	2.7944	1.7200	374.6	235.4	105.5
37	00	0054	Aug 07	07:23:25	9992	-24062	T-	pp	-0.0147	2.8704	1.7924	375.5	235.8	106.2
38	01	0072	Aug 17	14:12:55	9817	-23839	T-	pp	-0.0795	2.7532	1.6715	375.7	235.1	104.4
39	02	0090	Aug 28	21:12:52	9642	-23616	T-	pp	-0.1360	2.6515	1.5661	375.4	233.6	100.9
40	03	0108	Sep 08	04:20:54	9469	-23393	T-	pp	-0.1859	2.5618	1.4727	374.7	231.5	96.0
41	04	0126	Sep 19	11:39:11	9297	-23170	T-	pp	-0.2273	2.4876	1.3951	373.8	229.3	90.6
42	05	0144	Sep 29	19:06:02	9125	-22947	T-	pp	-0.2618	2.4259	1.3301	372.8	227.1	84.9
43	06	0162	Oct 11	02:42:39	8954	-22724	T	-p	-0.2884	2.3785	1.2801	371.9	225.1	79.7
44	07	0180	Oct 21	10:27:05	8783	-22501	T	-p	-0.3088	2.3422	1.2415	371.1	223.4	75.0
45	08	0198	Nov 01	18:17:50	8612	-22278	T	-p	-0.3241	2.3148	1.2126	370.3	221.9	71.0
46	09	0216	Nov 12	02:14:52	8441	-22055	T	-p	-0.3344	2.2963	1.1932	369.6	220.9	68.1
47	10	0234	Nov 23	10:16:03	8269	-21832	T	-p	-0.3410	2.2844	1.1812	369.0	220.1	66.2
48	11	0252	Dec 03	18:19:33	8098	-21609	T	-p	-0.3462	2.2744	1.1719	368.2	219.4	64.6
49	12	0270	Dec 15	02:22:52	7925	-21386	T	-p	-0.3516	2.2636	1.1627	367.3	218.7	63.0
50	13	0288	Dec 25	10:25:39	7752	-21163	T	-p	-0.3579	2.2510	1.1524	366.2	218.0	61.1
51	14	0307	Jan 05	18:25:38	7578	-20940	T	-p	-0.3666	2.2335	1.1380	364.9	217.0	58.4

52	15	0325 Jan 16	02:20:38	7403 -20717	T	-p	-0.3796	2.2076	1.1159	363.1	215.5	53.9
53	16	0343 Jan 27	10:10:21	7227 -20494	T	-p	-0.3973	2.1729	1.0856	360.9	213.5	46.7
54	17	0361 Feb 06	17:53:12	7051 -20271	T	-t	-0.4212	2.1266	1.0442	358.1	210.8	34.0
55	18	0379 Feb 18	01:28:50	6874 -20048	P	-t	-0.4515	2.0683	0.9913	354.7	207.1	-
56	19	0397 Feb 28	08:56:09	6696 -19825	P	-t	-0.4891	1.9965	0.9251	350.6	202.1	-
57	20	0415 Mar 11	16:16:10	6518 -19602	P	-t	-0.5332	1.9126	0.8471	345.5	195.8	-
58	21	0433 Mar 21	23:28:42	6339 -19379	P	-t	-0.5839	1.8166	0.7569	339.5	187.6	-
59	22	0451 Apr 02	06:33:15	6161 -19156	P	-t	-0.6418	1.7075	0.6537	332.3	177.0	-
60	23	0469 Apr 12	13:32:05	5983 -18933	P	-t	-0.7049	1.5888	0.5406	323.8	163.5	-
61	24	0487 Apr 23	20:25:16	5806 -18710	P	-t	-0.7733	1.4605	0.4178	313.8	146.1	-
62	25	0505 May 04	03:15:22	5630 -18487	P	-t	-0.8448	1.3269	0.2892	302.5	123.6	-
63	26	0523 May 15	10:00:51	5453 -18264	P	-t	-0.9205	1.1856	0.1526	289.2	91.3	-
64	27	0541 May 25	16:46:38	5277 -18041	P	-t	-0.9967	1.0436	0.0149	274.3	28.9	-
65	28	0559 Jun 05	23:31:22	5103 -17818	N	-t	-1.0745	0.8988	-0.1260	257.4	-	-
66	29	0577 Jun 16	06:19:01	4930 -17595	N	-t	-1.1505	0.7577	-0.2639	238.8	-	-
67	30	0595 Jun 27	13:08:17	4758 -17372	N	-t	-1.2258	0.6181	-0.4007	217.8	-	-
68	31	0613 Jul 07	20:04:08	4588 -17149	N	-t	-1.2967	0.4869	-0.5296	195.0	-	-
69	32	0631 Jul 19	03:05:01	4419 -16926	N	-t	-1.3643	0.3619	-0.6528	169.4	-	-
70	33	0649 Jul 29	10:13:10	4251 -16703	N	-t	-1.4270	0.2462	-0.7672	140.7	-	-
71	34	0667 Aug 09	17:28:51	4086 -16480	N	-t	-1.4843	0.1406	-0.8718	107.0	-	-
72	35	0685 Aug 20	00:54:09	3922 -16257	Ne	-h	-1.5348	0.0477	-0.9641	62.6	-	-

SAROS SERIES

Saros series 69 contains 73 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-34	-0530 Jul 15 06:08:51	17564 -31286	N	t-	-1.5124	0.1200	-0.9536	106.9	-	-	-	-	-
02	-33	-0512 Jul 25 12:46:13	17295 -31063	N	t-	-1.4403	0.2532	-0.8224	153.4	-	-	-	-	-
03	-32	-0494 Aug 05 19:30:53	17008 -30840	N	t-	-1.3732	0.3773	-0.7004	185.1	-	-	-	-	-
04	-31	-0476 Aug 16 02:25:34	16691 -30617	N	t-	-1.3136	0.4880	-0.5920	208.3	-	-	-	-	-
05	-30	-0458 Aug 27 09:29:39	16383 -30394	N	t-	-1.2607	0.5861	-0.4962	226.0	-	-	-	-	-
06	-29	-0440 Sep 06 16:44:40	16084 -30171	N	t-	-1.2157	0.6697	-0.4147	239.4	-	-	-	-	-
07	-28	-0422 Sep 18 00:08:38	15793 -29948	N	t-	-1.1774	0.7411	-0.3452	249.9	-	-	-	-	-
08	-27	-0404 Sep 28 07:43:58	15510 -29725	N	t-	-1.1475	0.7968	-0.2912	257.4	-	-	-	-	-
09	-26	-0386 Oct 09 15:27:42	15233 -29502	N	t-	-1.1237	0.8411	-0.2481	262.9	-	-	-	-	-
10	-25	-0368 Oct 19 23:20:11	14964 -29279	N	t-	-1.1064	0.8732	-0.2167	266.6	-	-	-	-	-
11	-24	-0350 Oct 31 07:19:19	14700 -29056	N	t-	-1.0937	0.8965	-0.1935	269.0	-	-	-	-	-
12	-23	-0332 Nov 10 15:25:20	14443 -28833	N	t-	-1.0858	0.9107	-0.1787	270.2	-	-	-	-	-
13	-22	-0314 Nov 21 23:34:17	14192 -28610	N	h-	-1.0798	0.9209	-0.1671	270.8	-	-	-	-	-
14	-21	-0296 Dec 02 07:45:27	13946 -28387	N	h-	-1.0750	0.9287	-0.1572	271.0	-	-	-	-	-
15	-20	-0278 Dec 13 15:56:41	13705 -28164	N	h-	-1.0695	0.9374	-0.1456	271.2	-	-	-	-	-
16	-19	-0260 Dec 24 00:07:39	13470 -27941	N	h-	-1.0628	0.9478	-0.1316	271.5	-	-	-	-	-
17	-18	-0241 Jan 04 08:13:50	13239 -27718	N	h-	-1.0515	0.9663	-0.1086	272.7	-	-	-	-	-

18	-17	-0223	Jan 14	16:16:46	13013	-27495	N	h-	-1.0368	0.9908	-0.0792	274.4	-	-
19	-16	-0205	Jan 26	00:12:42	12792	-27272	Nx	h-	-1.0154	1.0273	-0.0372	277.2	-	-
20	-15	-0187	Feb 05	08:03:58	12575	-27049	P	h-	-0.9893	1.0721	0.0136	280.7	27.9	-
21	-14	-0169	Feb 16	15:45:33	12362	-26826	P	h-	-0.9542	1.1333	0.0811	285.4	67.1	-
22	-13	-0151	Feb 26	23:22:10	12153	-26603	P	h-	-0.9140	1.2039	0.1582	290.6	92.5	-
23	-12	-0133	Mar 10	06:49:26	11947	-26380	P	h-	-0.8652	1.2902	0.2510	296.6	114.6	-
24	-11	-0115	Mar 20	14:11:16	11746	-26157	P	h-	-0.8108	1.3866	0.3539	302.6	133.6	-
25	-10	-0097	Mar 31	21:24:58	11547	-25934	P	h-	-0.7487	1.4975	0.4711	309.0	150.9	-
26	-09	-0079	Apr 11	04:34:56	11352	-25711	P	a-	-0.6824	1.6161	0.5957	314.9	165.8	-
27	-08	-0061	Apr 22	11:39:00	11160	-25488	P	a-	-0.6101	1.7458	0.7311	320.5	179.1	-
28	-07	-0043	May 02	18:40:06	10971	-25265	P	a-	-0.5343	1.8823	0.8730	325.4	190.3	-
29	-06	-0025	May 14	01:38:36	10785	-25042	T	a-	-0.4554	2.0245	1.0200	329.6	199.7	22.2
30	-05	-0007	May 24	08:37:10	10601	-24819	T	a-	-0.3757	2.1687	1.1685	332.8	207.1	61.3
31	-04	0011	Jun 04	15:36:12	10419	-24596	T	a-	-0.2951	2.3147	1.3183	335.2	212.7	79.8
32	-03	0029	Jun 14	22:37:10	10240	-24373	T-	p-	-0.2151	2.4598	1.4666	336.6	216.6	91.2
33	-02	0047	Jun 26	05:42:20	10062	-24150	T-	pp	-0.1377	2.6006	1.6100	337.1	218.9	97.8
34	-01	0065	Jul 06	12:52:09	9886	-23927	T-	pp	-0.0633	2.7361	1.7475	336.7	219.8	101.1
35	00	0083	Jul 17	20:07:38	9711	-23704	T+	pp	0.0073	2.8381	1.8510	335.7	219.5	101.8
36	01	0101	Jul 28	03:30:19	9537	-23481	T+	pp	0.0728	2.7174	1.7313	334.2	218.3	100.3
37	02	0119	Aug 08	11:01:20	9365	-23258	T+	pp	0.1323	2.6079	1.6224	332.2	216.3	97.1
38	03	0137	Aug 18	18:41:26	9193	-23035	T+	pp	0.1847	2.5116	1.5263	330.1	213.9	92.8
39	04	0155	Aug 30	02:29:41	9021	-22812	T+	-p	0.2312	2.4263	1.4409	327.8	211.2	87.7
40	05	0173	Sep 09	10:28:23	8850	-22589	T+	-p	0.2696	2.3561	1.3704	325.5	208.5	82.3
41	06	0191	Sep 20	18:35:47	8679	-22366	T	-p	0.3014	2.2979	1.3118	323.5	206.0	76.9
42	07	0209	Oct 01	02:52:37	8508	-22143	T	-p	0.3259	2.2531	1.2667	321.6	203.8	72.1
43	08	0227	Oct 12	11:16:57	8337	-21920	T	-p	0.3447	2.2188	1.2320	320.0	201.9	67.8
44	09	0245	Oct 22	19:49:31	8165	-21697	T	-p	0.3572	2.1960	1.2091	318.7	200.5	64.8
45	10	0263	Nov 03	04:28:18	7993	-21474	T	-p	0.3650	2.1814	1.1947	317.6	199.4	62.6

46	11	0281	Nov 13	13:11:53	7820 -21251	T	-p	0.3695	2.1729	1.1868	316.6	198.7	61.4
47	12	0299	Nov 24	21:59:39	7647 -21028	T	-p	0.3711	2.1696	1.1845	315.9	198.2	61.0
48	13	0317	Dec 05	06:49:18	7472 -20805	T	-p	0.3718	2.1674	1.1839	315.1	197.9	60.8
49	14	0335	Dec 16	15:39:41	7297 -20582	T	-p	0.3722	2.1658	1.1842	314.4	197.6	60.8
50	15	0353	Dec 27	00:27:46	7121 -20359	T	-p	0.3751	2.1592	1.1800	313.6	197.1	60.1
51	16	0372	Jan 07	09:14:17	6944 -20136	T	-p	0.3798	2.1492	1.1728	312.6	196.6	59.0
52	17	0390	Jan 17	17:56:15	6766 -19913	T	-p	0.3891	2.1305	1.1573	311.4	195.7	56.5
53	18	0408	Jan 29	02:32:45	6588 -19690	T	-p	0.4032	2.1029	1.1332	310.0	194.3	52.3
54	19	0426	Feb 08	11:02:26	6410 -19467	T	-p	0.4233	2.0642	1.0981	308.1	192.4	45.4
55	20	0444	Feb 19	19:25:21	6231 -19244	T	-a	0.4493	2.0144	1.0521	305.9	189.9	33.5
56	21	0462	Mar 02	03:40:50	6053 -19021	P	-a	0.4820	1.9527	0.9941	303.2	186.4	-
57	22	0480	Mar 12	11:47:44	5876 -18798	P	-a	0.5220	1.8775	0.9225	299.8	181.8	-
58	23	0498	Mar 23	19:47:39	5700 -18575	P	-a	0.5681	1.7911	0.8395	295.8	175.9	-
59	24	0516	Apr 03	03:39:59	5523 -18352	P	-a	0.6205	1.6935	0.7449	290.9	168.3	-
60	25	0534	Apr 14	11:25:38	5347 -18129	P	-a	0.6786	1.5855	0.6397	285.1	158.7	-
61	26	0552	Apr 24	19:05:07	5172 -17906	P	-a	0.7419	1.4682	0.5244	278.1	146.3	-
62	27	0570	May 06	02:39:45	4998 -17683	P	-a	0.8093	1.3438	0.4016	269.9	130.5	-
63	28	0588	May 16	10:10:43	4826 -17460	P	-a	0.8796	1.2143	0.2731	260.4	109.7	-
64	29	0606	May 27	17:37:56	4655 -17237	P	-a	0.9530	1.0794	0.1385	249.3	79.6	-
65	30	0624	Jun 07	01:04:30	4485 -17014	P	-a	1.0266	0.9445	0.0032	236.8	12.4	-
66	31	0642	Jun 18	08:30:02	4317 -16791	N	-a	1.1008	0.8089	-0.1334	222.5	-	-
67	32	0660	Jun 28	15:57:32	4151 -16568	N	-a	1.1732	0.6769	-0.2670	206.6	-	-
68	33	0678	Jul 09	23:25:34	3986 -16345	N	-a	1.2448	0.5467	-0.3995	188.4	-	-
69	34	0696	Jul 20	06:58:24	3824 -16122	N	-a	1.3120	0.4250	-0.5242	168.4	-	-
70	35	0714	Jul 31	14:33:59	3663 -15899	N	-a	1.3764	0.3085	-0.6441	145.4	-	-
71	36	0732	Aug 10	22:15:39	3505 -15676	N	-a	1.4353	0.2024	-0.7542	119.2	-	-
72	37	0750	Aug 22	06:02:05	3350 -15453	N	-a	1.4900	0.1043	-0.8567	86.6	-	-
73	38	0768	Sep 01	13:56:35	3197 -15230	Ne	-a	1.5377	0.0190	-0.9466	37.3	-	-

SAROS SERIES

70

Saros series 70 contains 72 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-36	-0519 Jun 13 16:58:32	17401 -31151	Nb	a-	1.5034	0.0832	-0.8849	79.0	-	-			
02	-35	-0501 Jun 25 00:14:49	17133 -30928	N	a-	1.4275	0.2215	-0.7448	126.9	-	-			
03	-34	-0483 Jul 05 07:36:37	16815 -30705	N	a-	1.3554	0.3532	-0.6118	157.8	-	-			
04	-33	-0465 Jul 16 15:03:17	16504 -30482	N	a-	1.2863	0.4798	-0.4847	181.2	-	-			
05	-32	-0447 Jul 26 22:38:05	16201 -30259	N	a-	1.2229	0.5959	-0.3684	199.2	-	-			
06	-31	-0429 Aug 07 06:20:12	15907 -30036	N	a-	1.1647	0.7031	-0.2616	213.6	-	-			
07	-30	-0411 Aug 17 14:10:30	15621 -29813	N	a-	1.1125	0.7991	-0.1663	225.0	-	-			
08	-29	-0393 Aug 28 22:09:41	15342 -29590	N	a-	1.0672	0.8828	-0.0836	234.1	-	-			
09	-28	-0375 Sep 08 06:17:37	15069 -29367	N	a-	1.0288	0.9538	-0.0138	241.1	-	-			

10	-27	-0357	Sep 19	14:34:53	14803	-29144	P	a-	0.9976	1.0118	0.0428	246.4	45.1	-
11	-26	-0339	Sep 29	22:59:07	14544	-28921	P	a-	0.9719	1.0596	0.0893	250.6	64.7	-
12	-25	-0321	Oct 11	07:32:24	14290	-28698	P	a-	0.9535	1.0940	0.1225	253.4	75.3	-
13	-24	-0303	Oct 21	16:11:33	14042	-28475	P	a-	0.9399	1.1193	0.1469	255.3	82.1	-
14	-23	-0285	Nov 02	00:57:20	13800	-28252	P	a-	0.9318	1.1347	0.1616	256.4	85.8	-
15	-22	-0267	Nov 12	09:46:16	13562	-28029	P	a-	0.9263	1.1448	0.1714	257.0	88.2	-
16	-21	-0249	Nov 23	18:39:02	13330	-27806	P	a-	0.9238	1.1493	0.1761	257.2	89.2	-
17	-20	-0231	Dec 04	03:32:05	13102	-27583	P	a-	0.9217	1.1529	0.1802	257.3	90.2	-
18	-19	-0213	Dec 15	12:25:04	12879	-27360	P	a-	0.9196	1.1562	0.1846	257.4	91.2	-
19	-18	-0195	Dec 25	21:15:34	12660	-27137	P	a-	0.9156	1.1628	0.1926	257.8	93.0	-
20	-17	-0176	Jan 06	06:03:22	12445	-26914	P	a-	0.9098	1.1727	0.2043	258.4	95.6	-
21	-16	-0158	Jan 16	14:45:01	12235	-26691	P	a-	0.8988	1.1916	0.2254	259.8	100.1	-
22	-15	-0140	Jan 27	23:21:10	12028	-26468	P	a-	0.8834	1.2189	0.2549	261.9	106.0	-
23	-14	-0122	Feb 07	07:49:32	11825	-26245	P	a-	0.8619	1.2569	0.2955	264.7	113.5	-
24	-13	-0104	Feb 18	16:11:42	11625	-26022	P	a-	0.8356	1.3039	0.3450	268.1	121.9	-
25	-12	-0086	Mar 01	00:23:32	11429	-25799	P	a-	0.8011	1.3660	0.4096	272.5	131.6	-
26	-11	-0068	Mar 11	08:29:01	11236	-25576	P	a-	0.7615	1.4375	0.4833	277.2	141.5	-
27	-10	-0050	Mar 22	16:24:44	11046	-25353	P	a-	0.7140	1.5237	0.5715	282.6	151.9	-
28	-09	-0032	Apr 02	00:14:45	10858	-25130	P	a-	0.6622	1.6180	0.6674	288.1	161.9	-
29	-08	-0014	Apr 13	07:55:02	10673	-24907	P	a-	0.6026	1.7268	0.7773	293.9	171.8	-
30	-07	0004	Apr 23	15:31:17	10491	-24684	P	a-	0.5399	1.8414	0.8926	299.4	180.8	-
31	-06	0022	May 04	23:00:32	10310	-24461	T	a-	0.4715	1.9669	1.0181	304.8	189.1	20.1
32	-05	0040	May 15	06:26:43	10132	-24238	T	a-	0.4009	2.0967	1.1473	309.7	196.3	55.3
33	-04	0058	May 26	13:48:35	9955	-24015	T	p-	0.3270	2.2331	1.2824	314.2	202.5	73.4
34	-03	0076	Jun 05	21:10:05	9780	-23792	T+	p-	0.2531	2.3696	1.4171	317.9	207.4	85.2
35	-02	0094	Jun 17	04:30:25	9606	-23569	T+	pp	0.1786	2.5077	1.5526	321.1	211.1	93.2
36	-01	0112	Jun 27	11:51:18	9433	-23346	T+	pp	0.1050	2.6443	1.6860	323.6	213.7	98.0

37	00	0130 Jul 08	19:14:06	9260 -23123	T+ pp	0.0334	2.7775	1.8154	325.4	215.1	100.3
38	01	0148 Jul 19	02:40:16	9089 -22900	T- pp	-0.0349	2.7769	1.8105	326.6	215.5	100.3
39	02	0166 Jul 30	10:10:38	8918 -22677	T- pp	-0.0989	2.6619	1.6906	327.4	215.0	98.4
40	03	0184 Aug 09	17:45:41	8747 -22454	T- -p	-0.1584	2.5555	1.5789	327.8	213.8	94.9
41	04	0202 Aug 21	01:27:30	8576 -22231	T- -p	-0.2115	2.4608	1.4786	327.9	212.1	90.0
42	05	0220 Aug 31	09:15:47	8405 -22008	T- -p	-0.2587	2.3773	1.3892	327.8	210.1	84.2
43	06	0238 Sep 11	17:10:37	8233 -21785	T -p	-0.2995	2.3054	1.3113	327.8	208.0	77.5
44	07	0256 Sep 22	01:12:44	8061 -21562	T -p	-0.3336	2.2458	1.2458	327.8	206.0	70.6
45	08	0274 Oct 03	09:22:12	7889 -21339	T -a	-0.3606	2.1993	1.1933	328.0	204.2	63.8
46	09	0292 Oct 13	17:38:27	7715 -21116	T -a	-0.3816	2.1636	1.1520	328.4	202.8	57.5
47	10	0310 Oct 25	01:59:52	7541 -20893	T -a	-0.3976	2.1369	1.1199	329.0	201.7	51.7
48	11	0328 Nov 04	10:26:55	7366 -20670	T -a	-0.4083	2.1198	1.0979	329.9	201.1	47.1
49	12	0346 Nov 15	18:58:00	7190 -20447	T -a	-0.4148	2.1101	1.0838	330.9	200.9	43.8
50	13	0364 Nov 26	03:31:03	7014 -20224	T -a	-0.4192	2.1041	1.0739	332.0	200.9	41.4
51	14	0382 Dec 07	12:04:55	6836 -20001	T -a	-0.4221	2.1003	1.0668	333.2	201.0	39.5
52	15	0400 Dec 17	20:37:21	6658 -19778	T -a	-0.4257	2.0951	1.0590	334.2	201.2	37.3
53	16	0418 Dec 29	05:07:46	6480 -19555	T -a	-0.4302	2.0879	1.0497	335.1	201.2	34.5
54	17	0437 Jan 08	13:32:12	6302 -19332	T -a	-0.4386	2.0731	1.0334	335.7	200.8	28.5
55	18	0455 Jan 19	21:51:55	6123 -19109	T -a	-0.4502	2.0524	1.0116	336.1	200.1	16.9
56	19	0473 Jan 30	06:02:55	5946 -18886	P -a	-0.4680	2.0201	0.9787	336.0	198.7	-
57	20	0491 Feb 10	14:06:05	5769 -18663	P -a	-0.4915	1.9771	0.9355	335.3	196.4	-
58	21	0509 Feb 20	21:58:17	5593 -18440	P -a	-0.5232	1.9190	0.8772	333.9	192.8	-
59	22	0527 Mar 04	05:41:46	5416 -18217	P -h	-0.5610	1.8496	0.8079	331.8	187.8	-
60	23	0545 Mar 14	13:14:23	5241 -17994	P -h	-0.6067	1.7657	0.7240	328.7	181.0	-
61	24	0563 Mar 25	20:36:29	5067 -17771	P -t	-0.6602	1.6676	0.6260	324.3	171.6	-
62	25	0581 Apr 05	03:48:48	4894 -17548	P -t	-0.7208	1.5565	0.5147	318.6	158.9	-
63	26	0599 Apr 16	10:52:10	4722 -17325	P -t	-0.7879	1.4335	0.3913	311.1	141.6	-
64	27	0617 Apr 26	17:47:20	4552 -17102	P -t	-0.8606	1.3004	0.2574	301.8	117.6	-

65	28	0635	May 08	00:34:27	4383	-16879	P	-t	-0.9389	1.1574	0.1133	290.2	79.9	-
66	29	0653	May 18	07:16:09	4216	-16656	Nx	-t	-1.0205	1.0084	-0.0371	276.1	-	-
67	30	0671	May 29	13:53:18	4051	-16433	N	-t	-1.1050	0.8544	-0.1931	259.1	-	-
68	31	0689	Jun 08	20:26:39	3888	-16210	N	-t	-1.1912	0.6972	-0.3526	238.5	-	-
69	32	0707	Jun 20	02:58:47	3726	-15987	N	-t	-1.2775	0.5405	-0.5122	213.9	-	-
70	33	0725	Jun 30	09:30:44	3567	-15764	N	-t	-1.3626	0.3858	-0.6700	183.9	-	-
71	34	0743	Jul 11	16:04:57	3411	-15541	N	-t	-1.4449	0.2366	-0.8229	146.4	-	-
72	35	0761	Jul 21	22:40:15	3257	-15318	Ne	-t	-1.5252	0.0914	-0.9721	92.4	-	-

SAROS SERIES

71

Saros series 71 contains 72 lunar eclipses.

PHASE													
DURATIONS													
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-36	-0472	Jun 04	16:30:04	16625	-30570	Nb a-	-1.5485	0.0029	-0.9699	15.0	-	-

02	-35	-0454	Jun 15	23:40:04	16320	-30347	N	h-	-1.4798	0.1307	-0.8459	99.6	-	-
03	-34	-0436	Jun 26	06:51:03	16022	-30124	N	h-	-1.4124	0.2566	-0.7243	138.6	-	-
04	-33	-0418	Jul 07	14:04:09	15733	-29901	N	h-	-1.3476	0.3781	-0.6077	167.0	-	-
05	-32	-0400	Jul 17	21:20:54	15451	-29678	N	h-	-1.2860	0.4938	-0.4974	189.7	-	-
06	-31	-0382	Jul 29	04:41:11	15176	-29455	N	h-	-1.2281	0.6030	-0.3941	208.3	-	-
07	-30	-0364	Aug 08	12:07:55	14908	-29232	N	h-	-1.1762	0.7013	-0.3020	223.5	-	-
08	-29	-0346	Aug 19	19:40:19	14646	-29009	N	h-	-1.1298	0.7897	-0.2200	236.2	-	-
09	-28	-0328	Aug 30	03:19:32	14390	-28786	N	h-	-1.0896	0.8667	-0.1494	246.7	-	-
10	-27	-0310	Sep 10	11:05:38	14139	-28563	N	h-	-1.0558	0.9320	-0.0908	255.4	-	-
11	-26	-0292	Sep 20	18:59:25	13895	-28340	N	h-	-1.0290	0.9845	-0.0447	262.2	-	-
12	-25	-0274	Oct 02	03:00:27	13655	-28117	Nx	h-	-1.0091	1.0243	-0.0112	267.6	-	-
13	-24	-0256	Oct 12	11:06:48	13421	-27894	P	h-	-0.9942	1.0546	0.0132	271.9	26.9	-
14	-23	-0238	Oct 23	19:20:15	13191	-27671	P	h-	-0.9857	1.0730	0.0261	274.9	37.8	-
15	-22	-0220	Nov 03	03:37:42	12966	-27448	P	h-	-0.9809	1.0843	0.0325	277.2	42.2	-
16	-21	-0202	Nov 14	11:59:07	12746	-27225	P	h-	-0.9801	1.0878	0.0317	278.6	41.9	-
17	-20	-0184	Nov 24	20:20:37	12530	-27002	P	h-	-0.9799	1.0900	0.0303	279.9	41.0	-
18	-19	-0166	Dec 06	04:43:36	12317	-26779	P	t-	-0.9816	1.0884	0.0257	280.7	37.9	-
19	-18	-0148	Dec 16	13:03:46	12109	-26556	P	t-	-0.9813	1.0901	0.0251	281.8	37.6	-
20	-17	-0130	Dec 27	21:20:49	11905	-26333	P	t-	-0.9792	1.0947	0.0281	283.1	39.9	-
21	-16	-0111	Jan 07	05:31:43	11704	-26110	P	t-	-0.9726	1.1074	0.0398	285.2	47.5	-
22	-15	-0093	Jan 18	13:36:32	11506	-25887	P	t-	-0.9618	1.1275	0.0595	288.0	58.1	-
23	-14	-0075	Jan 28	21:32:19	11312	-25664	P	t-	-0.9442	1.1597	0.0918	291.8	72.0	-
24	-13	-0057	Feb 09	05:19:04	11120	-25441	P	t-	-0.9199	1.2040	0.1365	296.6	87.5	-
25	-12	-0039	Feb 19	12:55:29	10932	-25218	P	t-	-0.8878	1.2626	0.1958	302.5	104.1	-
26	-11	-0021	Mar 02	20:22:17	10746	-24995	P	t-	-0.8485	1.3343	0.2683	309.2	120.9	-
27	-10	-0003	Mar 13	03:37:06	10562	-24772	P	t-	-0.8000	1.4228	0.3577	316.8	138.1	-
28	-09	0015	Mar 24	10:43:00	10381	-24549	P	t-	-0.7449	1.5236	0.4593	324.7	154.4	-
29	-08	0033	Apr 03	17:37:53	10202	-24326	P	t-	-0.6813	1.6399	0.5764	332.8	170.1	-

30	-07	0051	Apr 15	00:25:55	10025	-24103	P	t-	-0.6122	1.7664	0.7034	340.8	184.4	-
31	-06	0069	Apr 25	07:03:32	9849	-23880	P	t-	-0.5351	1.9077	0.8449	348.5	197.6	-
32	-05	0087	May 06	13:37:09	9674	-23657	P	t-	-0.4551	2.0546	0.9917	355.4	208.7	-
33	-04	0105	May 16	20:03:52	9501	-23434	T	t-	-0.3700	2.2110	1.1477	361.4	218.2	60.7
34	-03	0123	May 28	02:29:02	9328	-23211	T	pp	-0.2837	2.3698	1.3057	366.4	225.6	82.7
35	-02	0141	Jun 07	08:50:20	9157	-22988	T-	pp	-0.1944	2.5341	1.4688	370.2	231.1	96.1
36	-01	0159	Jun 18	15:13:26	8985	-22765	T-	pp	-0.1069	2.6956	1.6287	372.8	234.5	103.5
37	00	0177	Jun 28	21:36:29	8814	-22542	T-	pp	-0.0198	2.8563	1.7874	374.2	235.9	106.5
38	01	0195	Jul 10	04:03:03	8643	-22319	T+	pp	0.0641	2.7762	1.7051	374.4	235.6	105.5
39	02	0213	Jul 20	10:33:28	8472	-22096	T+	pp	0.1446	2.6299	1.5560	373.7	233.6	100.8
40	03	0231	Jul 31	17:10:42	8301	-21873	T+	pp	0.2192	2.4944	1.4178	372.1	230.2	92.7
41	04	0249	Aug 10	23:54:59	8129	-21650	T	pp	0.2879	2.3699	1.2902	369.8	225.8	81.1
42	05	0267	Aug 22	06:47:02	7957	-21427	T	-t	0.3501	2.2574	1.1746	367.1	220.7	65.5
43	06	0285	Sep 01	13:48:43	7784	-21204	T	-t	0.4042	2.1596	1.0737	364.2	215.2	44.0
44	07	0303	Sep 12	20:59:20	7610	-20981	P	-t	0.4510	2.0753	0.9864	361.3	209.6	-
45	08	0321	Sep 23	04:19:55	7435	-20758	P	-t	0.4898	2.0054	0.9137	358.5	204.4	-
46	09	0339	Oct 04	11:49:32	7260	-20535	P	-t	0.5214	1.9487	0.8545	356.0	199.6	-
47	10	0357	Oct 14	19:29:06	7084	-20312	P	-t	0.5453	1.9059	0.8097	353.9	195.7	-
48	11	0375	Oct 26	03:16:29	6906	-20089	P	-t	0.5630	1.8742	0.7765	352.2	192.6	-
49	12	0393	Nov 05	11:10:42	6729	-19866	P	-t	0.5755	1.8517	0.7531	350.8	190.2	-
50	13	0411	Nov 16	19:10:51	6551	-19643	P	-t	0.5835	1.8370	0.7382	349.6	188.6	-
51	14	0429	Nov 27	03:15:32	6372	-19420	P	-t	0.5886	1.8275	0.7293	348.6	187.5	-
52	15	0447	Dec 08	11:21:40	6194	-19197	P	-t	0.5926	1.8195	0.7226	347.5	186.5	-
53	16	0465	Dec 18	19:28:13	6016	-18974	P	-t	0.5967	1.8108	0.7160	346.3	185.6	-
54	17	0483	Dec 30	03:33:13	5839	-18751	P	-t	0.6026	1.7984	0.7067	344.8	184.4	-
55	18	0502	Jan 09	11:36:08	5663	-18528	P	-t	0.6109	1.7814	0.6933	342.9	182.7	-
56	19	0520	Jan 20	19:32:49	5485	-18305	P	-t	0.6247	1.7540	0.6703	340.3	180.0	-
57	20	0538	Jan 31	03:25:09	5310	-18082	P	-t	0.6425	1.7187	0.6399	337.2	176.4	-

58	21	0556	Feb 11	11:09:19	5135 -17859	P	-t	0.6675	1.6701	0.5967	333.1	171.2	-
59	22	0574	Feb 21	18:47:51	4962 -17636	P	-t	0.6978	1.6116	0.5440	328.3	164.5	-
60	23	0592	Mar 04	02:16:44	4790 -17413	P	-t	0.7367	1.5372	0.4757	322.1	155.1	-
61	24	0610	Mar 15	09:40:14	4619 -17190	P	-t	0.7808	1.4533	0.3978	314.9	143.2	-
62	25	0628	Mar 25	16:54:58	4450 -16967	P	-t	0.8324	1.3554	0.3061	306.2	127.0	-
63	26	0646	Apr 06	00:04:06	4282 -16744	P	-t	0.8895	1.2476	0.2044	296.0	105.1	-
64	27	0664	Apr 16	07:06:19	4116 -16521	P	-t	0.9527	1.1287	0.0913	284.0	71.1	-
65	28	0682	Apr 27	14:04:47	3952 -16298	Nx	-t	1.0196	1.0031	-0.0287	270.1	-	-
66	29	0700	May 07	20:59:22	3790 -16075	N	-t	1.0904	0.8706	-0.1560	254.0	-	-
67	30	0718	May 19	03:51:17	3630 -15852	N	-t	1.1639	0.7333	-0.2885	235.3	-	-
68	31	0736	May 29	10:42:35	3472 -15629	N	-t	1.2382	0.5947	-0.4228	213.9	-	-
69	32	0754	Jun 09	17:34:32	3317 -15406	N	-t	1.3124	0.4568	-0.5569	189.1	-	-
70	33	0772	Jun 20	00:28:23	3165 -15183	N	-t	1.3856	0.3207	-0.6896	159.8	-	-
71	34	0790	Jul 01	07:25:17	3016 -14960	N	-t	1.4568	0.1886	-0.8190	123.5	-	-
72	35	0808	Jul 11	14:27:06	2870 -14737	Ne	-t	1.5247	0.0629	-0.9426	71.8	-	-

SAROS SERIES

72

Saros series 72 contains 72 lunar eclipses.

													PHASE
													DURATIONS
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-34	-0389 Jun 17	03:09:25	15284 -29543	N	t-	1.4986	0.1426	-0.9259	116.1	-	-	
02	-33	-0371 Jun 27	09:32:39	15013 -29320	N	t-	1.4147	0.2969	-0.7721	165.1	-	-	
03	-32	-0353 Jul 08	15:59:40	14748 -29097	N	t-	1.3329	0.4475	-0.6224	199.8	-	-	
04	-31	-0335 Jul 18	22:34:06	14490 -28874	N	t-	1.2560	0.5891	-0.4819	226.0	-	-	
05	-30	-0317 Jul 30	05:15:36	14238 -28651	N	t-	1.1839	0.7220	-0.3503	246.8	-	-	
06	-29	-0299 Aug 09	12:05:24	13991 -28428	N	t-	1.1175	0.8446	-0.2293	263.4	-	-	
07	-28	-0281 Aug 20	19:04:22	13749 -28205	N	t-	1.0578	0.9551	-0.1205	276.6	-	-	
08	-27	-0263 Aug 31	02:13:47	13513 -27982	Nx	t-	1.0057	1.0515	-0.0258	286.9	-	-	
09	-26	-0245 Sep 11	09:33:24	13281 -27759	P	t-	0.9610	1.1343	0.0555	295.0	57.2	-	
10	-25	-0227 Sep 21	17:03:05	13055 -27536	P	t-	0.9238	1.2033	0.1232	301.1	84.3	-	
11	-24	-0209 Oct 03	00:42:59	12832 -27313	P	t-	0.8938	1.2588	0.1776	305.6	100.2	-	
12	-23	-0191 Oct 13	08:32:42	12614 -27090	P	t-	0.8711	1.3008	0.2190	308.6	110.4	-	
13	-22	-0173 Oct 24	16:29:53	12401 -26867	P	t-	0.8538	1.3325	0.2506	310.6	117.3	-	
14	-21	-0155 Nov 04	00:34:55	12191 -26644	P	h-	0.8422	1.3537	0.2722	311.6	121.5	-	
15	-20	-0137 Nov 15	08:44:45	11985 -26421	P	h-	0.8339	1.3684	0.2881	311.9	124.4	-	
16	-19	-0119 Nov 25	16:59:21	11783 -26198	P	h-	0.8286	1.3772	0.2987	311.7	126.2	-	
17	-18	-0101 Dec 07	01:14:01	11584 -25975	P	h-	0.8226	1.3867	0.3109	311.4	128.2	-	
18	-17	-0083 Dec 17	09:30:45	11388 -25752	P	a-	0.8178	1.3940	0.3215	310.9	129.8	-	
19	-16	-0065 Dec 28	17:44:40	11196 -25529	P	a-	0.8105	1.4053	0.3368	310.7	132.3	-	
20	-15	-0046 Jan 08	01:56:02	11006 -25306	P	a-	0.8001	1.4220	0.3583	310.7	135.6	-	
21	-14	-0028 Jan 19	10:01:13	10819 -25083	P	a-	0.7841	1.4487	0.3903	311.3	140.5	-	

22	-13	-0010	Jan 29	18:02:01	10635	-24860	P	a-	0.7637	1.4832	0.4306	312.4	146.2	-
23	-12	0008	Feb 10	01:55:27	10453	-24637	P	a-	0.7366	1.5298	0.4834	314.1	153.2	-
24	-11	0026	Feb 20	09:41:53	10273	-24414	P	a-	0.7030	1.5882	0.5482	316.3	161.0	-
25	-10	0044	Mar 02	17:20:47	10094	-24191	P	a-	0.6624	1.6594	0.6260	319.0	169.4	-
26	-09	0062	Mar 14	00:53:05	9918	-23968	P	a-	0.6151	1.7429	0.7160	322.0	177.9	-
27	-08	0080	Mar 24	08:17:51	9743	-23745	P	a-	0.5607	1.8395	0.8191	325.1	186.4	-
28	-07	0098	Apr 04	15:36:48	9569	-23522	P	a-	0.5004	1.9469	0.9329	328.2	194.4	-
29	-06	0116	Apr 14	22:50:23	9396	-23299	T	a-	0.4345	2.0648	1.0567	331.0	201.6	36.9
30	-05	0134	Apr 26	06:00:42	9224	-23076	T	a-	0.3648	2.1898	1.1873	333.3	207.7	64.1
31	-04	0152	May 06	13:06:28	9053	-22853	T	a-	0.2901	2.3242	1.3269	335.1	212.7	80.6
32	-03	0170	May 17	20:11:58	8882	-22630	T+	p-	0.2142	2.4613	1.4686	336.2	216.4	91.2
33	-02	0188	May 28	03:15:54	8711	-22407	T+	pp	0.1357	2.6032	1.6145	336.6	218.8	98.0
34	-01	0206	Jun 08	10:22:12	8540	-22184	T+	pp	0.0584	2.7432	1.7581	336.1	219.8	101.3
35	00	0224	Jun 18	17:28:31	8369	-21961	T-	pp	-0.0198	2.8128	1.8305	334.9	219.4	101.8
36	01	0242	Jun 30	00:40:21	8197	-21738	T-	pp	-0.0943	2.6748	1.6948	333.0	217.9	99.6
37	02	0260	Jul 10	07:55:34	8025	-21515	T-	pp	-0.1671	2.5403	1.5621	330.4	215.2	94.9
38	03	0278	Jul 21	15:17:39	7852	-21292	T-	p	-0.2349	2.4154	1.4384	327.4	211.7	87.9
39	04	0296	Jul 31	22:45:33	7679	-21069	T	-p	-0.2985	2.2983	1.3219	324.0	207.4	78.4
40	05	0314	Aug 12	06:22:48	7504	-20846	T	-p	-0.3552	2.1942	1.2180	320.5	202.8	66.6
41	06	0332	Aug 22	14:07:55	7329	-20623	T	-p	-0.4061	2.1009	1.1246	316.9	197.9	51.8
42	07	0350	Sep 02	22:01:41	7153	-20400	T	-a	-0.4507	2.0192	1.0425	313.4	193.0	30.9
43	08	0368	Sep 13	06:04:43	6976	-20177	P	-a	-0.4882	1.9507	0.9733	310.2	188.4	-
44	09	0386	Sep 24	14:17:03	6799	-19954	P	-a	-0.5186	1.8954	0.9173	307.4	184.3	-
45	10	0404	Oct 04	22:38:21	6621	-19731	P	-a	-0.5422	1.8523	0.8735	305.0	180.8	-
46	11	0422	Oct 16	07:06:52	6443	-19508	P	-a	-0.5604	1.8191	0.8398	303.0	178.0	-
47	12	0440	Oct 26	15:43:29	6264	-19285	P	-a	-0.5725	1.7972	0.8174	301.4	175.9	-
48	13	0458	Nov 07	00:25:45	6086	-19062	P	-a	-0.5804	1.7827	0.8029	300.3	174.5	-
49	14	0476	Nov 17	09:12:48	5908	-18839	P	-a	-0.5846	1.7749	0.7954	299.4	173.6	-

50	15	0494	Nov 28	18:02:34	5732	-18616	P	-a	-0.5869	1.7704	0.7915	298.7	173.1	-
51	16	0512	Dec 09	02:54:28	5555	-18393	P	-a	-0.5877	1.7684	0.7907	298.2	172.8	-
52	17	0530	Dec 20	11:45:39	5379	-18170	P	-a	-0.5893	1.7645	0.7885	297.5	172.4	-
53	18	0548	Dec 30	20:35:05	5204	-17947	P	-a	-0.5927	1.7573	0.7833	296.7	171.8	-
54	19	0567	Jan 11	05:21:17	5030	-17724	P	-a	-0.5990	1.7445	0.7730	295.6	170.9	-
55	20	0585	Jan 21	14:03:47	4857	-17501	P	-a	-0.6083	1.7261	0.7573	294.3	169.5	-
56	21	0603	Feb 01	22:39:19	4686	-17278	P	-a	-0.6239	1.6959	0.7302	292.5	167.1	-
57	22	0621	Feb 12	07:08:56	4516	-17055	P	-a	-0.6446	1.6564	0.6938	290.1	163.8	-
58	23	0639	Feb 23	15:30:42	4348	-16832	P	-a	-0.6720	1.6043	0.6449	287.0	159.1	-
59	24	0657	Mar 05	23:46:12	4181	-16609	P	-a	-0.7048	1.5425	0.5864	283.3	153.1	-
60	25	0675	Mar 17	07:51:56	4016	-16386	P	-a	-0.7459	1.4657	0.5126	278.5	144.8	-
61	26	0693	Mar 27	15:51:57	3853	-16163	P	-a	-0.7917	1.3801	0.4298	272.8	134.3	-
62	27	0711	Apr 07	23:43:02	3693	-15940	P	-a	-0.8454	1.2804	0.3325	265.7	119.9	-
63	28	0729	Apr 18	07:28:45	3534	-15717	P	-a	-0.9032	1.1733	0.2274	257.4	100.7	-
64	29	0747	Apr 29	15:06:35	3378	-15494	P	-a	-0.9676	1.0545	0.1101	247.3	71.3	-
65	30	0765	May 09	22:41:10	3225	-15271	N	-a	-1.0343	0.9315	-0.0120	235.7	-	-
66	31	0783	May 21	06:10:31	3074	-15048	N	-a	-1.1053	0.8011	-0.1422	221.7	-	-
67	32	0801	May 31	13:37:25	2927	-14825	N	-a	-1.1781	0.6678	-0.2758	205.4	-	-
68	33	0819	Jun 11	21:02:15	2783	-14602	N	-a	-1.2522	0.5323	-0.4123	186.2	-	-
69	34	0837	Jun 22	04:27:12	2643	-14379	N	-a	-1.3259	0.3978	-0.5484	163.3	-	-
70	35	0855	Jul 03	11:52:35	2506	-14156	N	-a	-1.3988	0.2653	-0.6832	135.3	-	-
71	36	0873	Jul 13	19:19:38	2373	-13933	N	-a	-1.4698	0.1364	-0.8151	98.4	-	-
72	37	0891	Jul 25	02:50:16	2245	-13710	Ne	-a	-1.5377	0.0137	-0.9413	31.6	-	-

SAROS SERIES

73

Saros series 73 contains 72 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-36	-0378 May 16	14:33:05	15119 -29408	Nb	a-	-1.4958	0.0966	-0.8704	84.9	-	-		
02	-35	-0360 May 26	21:48:05	14852 -29185	N	a-	-1.4185	0.2368	-0.7271	130.8	-	-		
03	-34	-0342 Jun 07	05:02:57	14591 -28962	N	a-	-1.3403	0.3790	-0.5822	162.8	-	-		
04	-33	-0324 Jun 17	12:21:15	14336 -28739	N	a-	-1.2642	0.5177	-0.4416	187.2	-	-		
05	-32	-0306 Jun 28	19:42:11	14087 -28516	N	a-	-1.1898	0.6536	-0.3044	206.9	-	-		
06	-31	-0288 Jul 09	03:08:49	13844 -28293	N	a-	-1.1192	0.7828	-0.1746	223.0	-	-		
07	-30	-0270 Jul 20	10:39:55	13605 -28070	N	a-	-1.0519	0.9063	-0.0510	236.4	-	-		
08	-29	-0252 Jul 30	18:19:20	13372 -27847	P	a-	-0.9909	1.0184	0.0607	247.1	53.8	-		
09	-28	-0234 Aug 11	02:05:02	13143 -27624	P	a-	-0.9348	1.1217	0.1632	256.0	86.8	-		
10	-27	-0216 Aug 21	09:59:23	12919 -27401	P	a-	-0.8856	1.2127	0.2529	263.2	106.5	-		
11	-26	-0198 Sep 01	18:01:27	12700 -27178	P	a-	-0.8423	1.2928	0.3315	268.9	120.4	-		
12	-25	-0180 Sep 12	02:13:27	12484 -26955	P	a-	-0.8069	1.3587	0.3957	273.4	130.1	-		

13	-24	-0162	Sep 23	10:33:11	12273	-26732	P	a-	-0.7780	1.4126	0.4479	276.8	137.1	-
14	-23	-0144	Oct 03	19:01:15	12066	-26509	P	a-	-0.7556	1.4545	0.4880	279.3	142.1	-
15	-22	-0126	Oct 15	03:36:39	11862	-26286	P	a-	-0.7394	1.4852	0.5171	281.1	145.5	-
16	-21	-0108	Oct 25	12:19:09	11662	-26063	P	a-	-0.7287	1.5055	0.5360	282.2	147.6	-
17	-20	-0090	Nov 05	21:06:05	11465	-25840	P	a-	-0.7218	1.5186	0.5481	282.9	148.9	-
18	-19	-0072	Nov 16	05:57:20	11271	-25617	P	a-	-0.7185	1.5251	0.5538	283.2	149.4	-
19	-18	-0054	Nov 27	14:50:14	11080	-25394	P	a-	-0.7166	1.5288	0.5572	283.4	149.8	-
20	-17	-0036	Dec 07	23:44:48	10892	-25171	P	a-	-0.7161	1.5295	0.5581	283.4	149.9	-
21	-16	-0018	Dec 19	08:36:48	10707	-24948	P	a-	-0.7137	1.5337	0.5629	283.6	150.4	-
22	-15	0000	Dec 29	17:27:44	10524	-24725	P	a-	-0.7104	1.5392	0.5695	283.9	151.2	-
23	-14	0019	Jan 10	02:13:15	10343	-24502	P	a-	-0.7026	1.5528	0.5844	284.7	152.8	-
24	-13	0037	Jan 20	10:54:28	10164	-24279	P	a-	-0.6917	1.5720	0.6053	285.8	155.1	-
25	-12	0055	Jan 31	19:27:30	9987	-24056	P	a-	-0.6739	1.6036	0.6388	287.6	158.6	-
26	-11	0073	Feb 11	03:54:58	9812	-23833	P	a-	-0.6518	1.6432	0.6804	289.8	162.7	-
27	-10	0091	Feb 22	12:13:30	9638	-23610	P	a-	-0.6221	1.6966	0.7358	292.7	167.9	-
28	-09	0109	Mar 04	20:24:13	9464	-23387	P	a-	-0.5863	1.7614	0.8025	295.9	173.6	-
29	-08	0127	Mar 16	04:25:48	9292	-23164	P	a-	-0.5431	1.8397	0.8825	299.7	179.8	-
30	-07	0145	Mar 26	12:20:04	9120	-22941	P	a-	-0.4942	1.9288	0.9730	303.6	186.1	-
31	-06	0163	Apr 06	20:06:21	8949	-22718	T	a-	-0.4388	2.0300	1.0752	307.6	192.3	40.3
32	-05	0181	Apr 17	03:45:05	8778	-22495	T	p-	-0.3774	2.1423	1.1881	311.6	198.2	61.7
33	-04	0199	Apr 28	11:17:53	8607	-22272	T	p-	-0.3115	2.2632	1.3090	315.4	203.5	76.1
34	-03	0217	May 08	18:45:21	8436	-22049	T-	p-	-0.2419	2.3913	1.4366	318.7	208.0	86.6
35	-02	0235	May 20	02:08:10	8265	-21826	T-	pp	-0.1688	2.5259	1.5700	321.6	211.6	94.0
36	-01	0253	May 30	09:27:57	8093	-21603	T-	pp	-0.0938	2.6646	1.7068	323.9	214.1	98.6
37	00	0271	Jun 10	16:45:36	7920	-21380	T-	pp	-0.0177	2.8055	1.8453	325.5	215.4	100.6
38	01	0289	Jun 21	00:03:20	7747	-21157	T+	pp	0.0577	2.7336	1.7703	326.5	215.5	100.1
39	02	0307	Jul 02	07:20:25	7573	-20934	T+	-p	0.1328	2.5977	1.6306	326.8	214.5	96.9
40	03	0325	Jul 12	14:40:46	7398	-20711	T+	-p	0.2043	2.4686	1.4973	326.4	212.5	91.2

41	04	0343	Jul 23	22:03:33	7223	-20488	T	-p	0.2729	2.3452	1.3690	325.6	209.4	82.7	
42	05	0361	Aug 03	05:31:47	7046	-20265	T	-a	0.3363	2.2315	1.2500	324.4	205.6	71.1	
43	06	0379	Aug 14	13:04:11	6869	-20042	T	-a	0.3954	2.1259	1.1387	322.9	201.1	55.0	
44	07	0397	Aug 24	20:43:52	6691	-19819	T	-a	0.4476	2.0332	1.0401	321.3	196.3	30.5	
45	08	0415	Sep 05	04:29:29	6513	-19596	P	-a	0.4939	1.9513	0.9519	319.7	191.4	-	
46	09	0433	Sep 15	12:22:19	6335	-19373	P	-a	0.5334	1.8820	0.8764	318.3	186.7	-	
47	10	0451	Sep 26	20:22:09	6156	-19150	P	-a	0.5664	1.8247	0.8129	317.3	182.3	-	
48	11	0469	Oct 07	04:29:25	5978	-18927	P	-a	0.5925	1.7797	0.7619	316.6	178.5	-	
49	12	0487	Oct 18	12:43:16	5802	-18704	P	-a	0.6122	1.7466	0.7229	316.3	175.5	-	
50	13	0505	Oct 28	21:01:51	5625	-18481	P	-a	0.6272	1.7217	0.6926	316.4	173.2	-	
51	14	0523	Nov 09	05:26:03	5448	-18258	P	-a	0.6368	1.7065	0.6725	317.0	171.7	-	
52	15	0541	Nov 19	13:52:58	5273	-18035	P	-a	0.6438	1.6959	0.6576	317.7	170.7	-	
53	16	0559	Nov 30	22:22:15	5098	-17812	P	-a	0.6480	1.6902	0.6480	318.6	170.2	-	
54	17	0577	Dec 11	06:50:38	4925	-17589	P	-a	0.6524	1.6837	0.6384	319.5	169.7	-	
55	18	0595	Dec 22	15:18:33	4754	-17366	P	-a	0.6565	1.6774	0.6296	320.3	169.2	-	
56	19	0614	Jan 01	23:42:34	4583	-17143	P	-a	0.6634	1.6658	0.6160	320.7	168.2	-	
57	20	0632	Jan 13	08:02:02	4414	-16920	P	-a	0.6733	1.6482	0.5971	320.7	166.6	-	
58	21	0650	Jan 23	16:14:37	4247	-16697	P	-a	0.6885	1.6209	0.5690	320.1	163.9	-	
59	22	0668	Feb 04	00:20:07	4081	-16474	P	-a	0.7087	1.5840	0.5316	318.8	159.8	-	
60	23	0686	Feb 14	08:15:54	3917	-16251	P	-h	0.7362	1.5336	0.4811	316.5	153.7	-	
61	24	0704	Feb 25	16:02:28	3756	-16028	P	-h	0.7706	1.4704	0.4181	313.1	145.1	-	
62	25	0722	Mar 07	23:38:28	3596	-15805	P	-t	0.8127	1.3929	0.3409	308.4	133.0	-	
63	26	0740	Mar 18	07:05:14	3439	-15582	P	-t	0.8617	1.3029	0.2511	302.2	116.0	-	
64	27	0758	Mar 29	14:19:50	3285	-15359	P	-t	0.9195	1.1967	0.1453	293.8	89.8	-	
65	28	0776	Apr 08	21:26:01	3133	-15136	P	-t	0.9831	1.0800	0.0286	283.4	40.6	-	
66	29	0794	Apr 20	04:21:44	2985	-14913	N	-t	1.0539	0.9501	-0.1015	270.2	-	-	
67	30	0812	Apr 30	11:11:23	2839	-14690	N	-t	1.1289	0.8127	-0.2393	254.2	-	-	
68	31	0830	May 11	17:51:21	2698	-14467	N	-t	1.2104	0.6635	-0.3893	233.7	-	-	

69	32	0848 May 22	00:28:20	2560 -14244	N	-t	1.2933	0.5121	-0.5418	208.9	-	-
70	33	0866 Jun 02	06:59:17	2425 -14021	N	-t	1.3794	0.3549	-0.7006	177.0	-	-
71	34	0884 Jun 12	13:29:13	2295 -13798	N	-t	1.4652	0.1984	-0.8591	134.6	-	-
72	35	0902 Jun 23	19:56:14	2169 -13575	Ne	-t	1.5524	0.0397	-1.0203	61.2	-	-

SAROS SERIES

74

Saros series 74 contains 72 lunar eclipses.

													PHASE	
													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-36	-0331 May 07	14:03:46	14436 -28827	Nb	a-	1.5502	0.0008	-0.9742	7.8	-	-		
02	-35	-0313 May 18	21:14:43	14185 -28604	N	h-	1.4829	0.1255	-0.8518	97.8	-	-		
03	-34	-0295 May 29	04:23:26	13939 -28381	N	h-	1.4143	0.2528	-0.7274	137.7	-	-		
04	-33	-0277 Jun 09	11:29:51	13699 -28158	N	h-	1.3443	0.3831	-0.6007	168.2	-	-		
05	-32	-0259 Jun 19	18:35:16	13464 -27935	N	h-	1.2741	0.5139	-0.4739	193.2	-	-		

06	-31	-0241	Jul 01	01:41:50	13233	-27712	N	h-	1.2053	0.6426	-0.3500	214.3	-	-
07	-30	-0223	Jul 11	08:50:31	13007	-27489	N	t-	1.1388	0.7672	-0.2305	232.3	-	-
08	-29	-0205	Jul 22	16:03:28	12786	-27266	N	t-	1.0763	0.8848	-0.1186	247.7	-	-
09	-28	-0187	Aug 01	23:19:19	12569	-27043	N	t-	1.0167	0.9971	-0.0123	261.1	-	-
10	-27	-0169	Aug 13	06:42:12	12356	-26820	P	t-	0.9634	1.0981	0.0823	272.4	65.9	-
11	-26	-0151	Aug 23	14:10:24	12147	-26597	P	t-	0.9149	1.1904	0.1681	282.2	93.4	-
12	-25	-0133	Sep 03	21:46:42	11942	-26374	P	t-	0.8738	1.2692	0.2402	290.2	110.8	-
13	-24	-0115	Sep 14	05:28:55	11740	-26151	P	t-	0.8382	1.3379	0.3023	297.1	123.6	-
14	-23	-0097	Sep 25	13:20:18	11542	-25928	P	t-	0.8107	1.3915	0.3496	302.6	132.4	-
15	-22	-0079	Oct 05	21:17:30	11347	-25705	P	t-	0.7887	1.4351	0.3870	307.2	138.9	-
16	-21	-0061	Oct 17	05:21:30	11155	-25482	P	t-	0.7730	1.4668	0.4129	310.8	143.3	-
17	-20	-0043	Oct 27	13:30:22	10966	-25259	P	t-	0.7619	1.4898	0.4306	313.7	146.4	-
18	-19	-0025	Nov 07	21:44:44	10780	-25036	P	t-	0.7565	1.5020	0.4382	315.8	147.9	-
19	-18	-0007	Nov 18	06:00:55	10596	-24813	P	t-	0.7529	1.5106	0.4428	317.6	148.9	-
20	-17	0011	Nov 29	14:18:40	10414	-24590	P	t-	0.7514	1.5151	0.4439	319.0	149.5	-
21	-16	0029	Dec 09	22:35:32	10235	-24367	P	t-	0.7499	1.5192	0.4454	320.3	150.1	-
22	-15	0047	Dec 21	06:51:24	10057	-24144	P	t-	0.7484	1.5229	0.4473	321.5	150.7	-
23	-14	0065	Dec 31	15:01:36	9881	-23921	P	t-	0.7428	1.5337	0.4568	323.1	152.5	-
24	-13	0084	Jan 11	23:07:35	9706	-23698	P	t-	0.7345	1.5492	0.4718	325.0	154.9	-
25	-12	0102	Jan 22	07:05:05	9533	-23475	P	t-	0.7199	1.5761	0.4987	327.5	159.0	-
26	-11	0120	Feb 02	14:56:03	9360	-23252	P	t-	0.7004	1.6115	0.5347	330.5	164.0	-
27	-10	0138	Feb 12	22:35:33	9188	-23029	P	t-	0.6724	1.6625	0.5865	334.3	170.7	-
28	-09	0156	Feb 24	06:07:20	9017	-22806	P	t-	0.6385	1.7240	0.6492	338.5	178.2	-
29	-08	0174	Mar 06	13:26:59	8846	-22583	P	t-	0.5955	1.8024	0.7288	343.3	186.6	-
30	-07	0192	Mar 16	20:37:36	8675	-22360	P	t-	0.5455	1.8935	0.8213	348.3	195.3	-
31	-06	0210	Mar 28	03:36:38	8504	-22137	P	t-	0.4864	2.0012	0.9302	353.6	204.2	-
32	-05	0228	Apr 07	10:28:01	8332	-21914	T	t-	0.4216	2.1195	1.0499	358.7	212.5	36.3
33	-04	0246	Apr 18	17:10:07	8161	-21691	T	t-	0.3496	2.2511	1.1824	363.4	220.0	66.6

34	-03	0264	Apr 28	23:44:49	7989	-21468	T+	pp	0.2719	2.3933	1.3254	367.5	226.4	84.7
35	-02	0282	May 10	06:13:40	7816	-21245	T+	pp	0.1896	2.5441	1.4766	370.7	231.3	96.5
36	-01	0300	May 20	12:38:15	7642	-21022	T+	pp	0.1038	2.7015	1.6341	373.0	234.6	103.7
37	00	0318	May 31	18:59:58	7467	-20799	T+	pp	0.0160	2.8628	1.7951	374.1	236.0	106.6
38	01	0336	Jun 11	01:19:49	7292	-20576	T-	pp	-0.0732	2.7580	1.6897	374.0	235.5	105.3
39	02	0354	Jun 22	07:41:06	7116	-20353	T-	pp	-0.1613	2.5969	1.5275	372.8	233.1	99.6
40	03	0372	Jul 02	14:04:31	6939	-20130	T-	pp	-0.2478	2.4390	1.3683	370.3	228.8	88.9
41	04	0390	Jul 13	20:31:14	6761	-19907	T	-t	-0.3315	2.2861	1.2137	366.8	222.7	71.7
42	05	0408	Jul 24	03:03:41	6583	-19684	T	-t	-0.4106	2.1421	1.0677	362.5	215.0	42.3
43	06	0426	Aug 04	09:42:58	6405	-19461	P	-t	-0.4840	2.0085	0.9318	357.4	206.0	-
44	07	0444	Aug 14	16:30:29	6227	-19238	P	-t	-0.5509	1.8870	0.8079	352.0	196.0	-
45	08	0462	Aug 25	23:25:23	6049	-19015	P	-t	-0.6119	1.7763	0.6947	346.3	185.2	-
46	09	0480	Sep 05	06:30:36	5871	-18792	P	-t	-0.6646	1.6808	0.5967	340.8	174.3	-
47	10	0498	Sep 16	13:45:04	5695	-18569	P	-t	-0.7100	1.5988	0.5123	335.6	163.6	-
48	11	0516	Sep 26	21:09:37	5518	-18346	P	-t	-0.7473	1.5314	0.4428	330.9	153.6	-
49	12	0534	Oct 08	04:43:19	5342	-18123	P	-t	-0.7773	1.4772	0.3868	326.7	144.6	-
50	13	0552	Oct 18	12:26:42	5167	-17900	P	-t	-0.8000	1.4364	0.3446	323.4	137.2	-
51	14	0570	Oct 29	20:18:13	4994	-17677	P	-t	-0.8163	1.4068	0.3141	320.7	131.4	-
52	15	0588	Nov 09	04:15:35	4821	-17454	P	-t	-0.8283	1.3849	0.2921	318.5	126.9	-
53	16	0606	Nov 20	12:19:35	4650	-17231	P	-t	-0.8354	1.3717	0.2792	316.9	124.1	-
54	17	0624	Nov 30	20:26:50	4481	-17008	P	-t	-0.8398	1.3630	0.2717	315.5	122.4	-
55	18	0642	Dec 12	04:36:58	4313	-16785	P	-t	-0.8428	1.3565	0.2672	314.2	121.2	-
56	19	0660	Dec 22	12:45:46	4146	-16562	P	-t	-0.8473	1.3469	0.2603	312.6	119.5	-
57	20	0679	Jan 02	20:55:00	3982	-16339	P	-t	-0.8519	1.3366	0.2535	310.8	117.8	-
58	21	0697	Jan 13	05:00:08	3819	-16116	P	-t	-0.8601	1.3195	0.2405	308.4	114.7	-
59	22	0715	Jan 24	13:01:07	3659	-15893	P	-t	-0.8723	1.2947	0.2205	305.2	109.9	-
60	23	0733	Feb 03	20:55:25	3501	-15670	P	-t	-0.8903	1.2591	0.1902	301.0	102.3	-
61	24	0751	Feb 15	04:44:01	3345	-15447	P	-t	-0.9135	1.2135	0.1504	295.8	91.2	-

62	25	0769	Feb 25	12:24:44	3193	-15224	P	-t	-0.9436	1.1553	0.0983	289.2	74.1	-
63	26	0787	Mar 08	19:58:14	3043	-15001	P	-t	-0.9799	1.0854	0.0347	281.2	44.3	-
64	27	0805	Mar 19	03:24:04	2896	-14778	Nx	-t	-1.0232	1.0029	-0.0415	271.4	-	-
65	28	0823	Mar 30	10:43:23	2753	-14555	N	-t	-1.0722	0.9097	-0.1284	259.8	-	-
66	29	0841	Apr 09	17:55:20	2614	-14332	N	-t	-1.1279	0.8044	-0.2275	245.8	-	-
67	30	0859	Apr 21	01:02:34	2478	-14109	N	-t	-1.1880	0.6912	-0.3348	229.4	-	-
68	31	0877	May 01	08:04:53	2346	-13886	N	-t	-1.2528	0.5693	-0.4510	209.7	-	-
69	32	0895	May 12	15:05:21	2218	-13663	N	-t	-1.3197	0.4439	-0.5712	186.6	-	-
70	33	0913	May 22	22:02:04	2094	-13440	N	-t	-1.3904	0.3118	-0.6985	157.6	-	-
71	34	0931	Jun 03	05:00:15	1975	-13217	N	-t	-1.4606	0.1810	-0.8252	121.0	-	-
72	35	0949	Jun 13	11:57:25	1860	-12994	Ne	-t	-1.5324	0.0473	-0.9551	62.3	-	-

SAROS SERIES

75

Saros series 75 contains 72 lunar eclipses.

PHASE													
DURATIONS													
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m

GREATEST

ECLIPSE

01	-35	-0266	May 08	18:09:15	13556	-28023	Nb	t-	-1.5751	0.0028	-1.0667	16.4	-	-
02	-34	-0248	May 19	00:30:24	13323	-27800	N	t-	-1.4899	0.1584	-0.9095	122.2	-	-
03	-33	-0230	May 30	06:49:26	13096	-27577	N	t-	-1.4022	0.3187	-0.7480	170.6	-	-
04	-32	-0212	Jun 09	13:09:57	12873	-27354	N	t-	-1.3148	0.4786	-0.5872	205.8	-	-
05	-31	-0194	Jun 20	19:32:15	12654	-27131	N	t-	-1.2281	0.6374	-0.4280	233.6	-	-
06	-30	-0176	Jul 01	01:58:44	12440	-26908	N	t-	-1.1437	0.7923	-0.2731	256.1	-	-
07	-29	-0158	Jul 12	08:30:19	12229	-26685	N	t-	-1.0624	0.9416	-0.1241	274.6	-	-
08	-28	-0140	Jul 22	15:09:06	12022	-26462	P	t-	-0.9859	1.0823	0.0161	289.6	31.1	-
09	-27	-0122	Aug 02	21:56:16	11820	-26239	P	t-	-0.9155	1.2119	0.1448	301.7	91.3	-
10	-26	-0104	Aug 13	04:51:11	11620	-26016	P	t-	-0.8506	1.3315	0.2634	311.5	120.8	-
11	-25	-0086	Aug 24	11:57:02	11424	-25793	P	t-	-0.7938	1.4364	0.3671	319.2	140.2	-
12	-24	-0068	Sep 03	19:12:21	11231	-25570	P	t-	-0.7439	1.5284	0.4581	325.1	154.0	-
13	-23	-0050	Sep 15	02:39:25	11041	-25347	P	t-	-0.7029	1.6041	0.5328	329.5	163.8	-
14	-22	-0032	Sep 25	10:15:03	10853	-25124	P	t-	-0.6682	1.6682	0.5960	332.7	171.1	-
15	-21	-0014	Oct 06	18:02:13	10668	-24901	P	t-	-0.6423	1.7160	0.6433	334.7	175.9	-
16	-20	0004	Oct 17	01:57:00	10486	-24678	P	h-	-0.6219	1.7535	0.6806	335.9	179.4	-
17	-19	0022	Oct 28	10:00:48	10305	-24455	P	h-	-0.6081	1.7787	0.7063	336.4	181.5	-
18	-18	0040	Nov 07	18:10:06	10127	-24232	P	a-	-0.5980	1.7967	0.7251	336.4	182.8	-
19	-17	0058	Nov 19	02:25:57	9950	-24009	P	a-	-0.5923	1.8064	0.7365	335.9	183.4	-
20	-16	0076	Nov 29	10:44:11	9775	-23786	P	a-	-0.5879	1.8133	0.7456	335.1	183.8	-
21	-15	0094	Dec 10	19:04:29	9601	-23563	P	a-	-0.5842	1.8186	0.7540	334.2	184.0	-
22	-14	0112	Dec 21	03:24:24	9428	-23340	P	a-	-0.5793	1.8257	0.7647	333.3	184.5	-
23	-13	0131	Jan 01	11:43:30	9256	-23117	P	a-	-0.5727	1.8357	0.7791	332.5	185.3	-
24	-12	0149	Jan 11	19:57:43	9084	-22894	P	a-	-0.5613	1.8540	0.8024	331.9	186.8	-
25	-11	0167	Jan 23	04:07:59	8913	-22671	P	a-	-0.5458	1.8797	0.8335	331.7	188.8	-

26	-10	0185	Feb 02	12:11:36	8742	-22448	P	a-	-0.5240	1.9167	0.8766	331.8	191.6	-
27	-09	0203	Feb 13	20:10:07	8571	-22225	P	a-	-0.4969	1.9632	0.9293	332.2	194.9	-
28	-08	0221	Feb 24	03:59:16	8400	-22002	P	a-	-0.4613	2.0253	0.9979	333.0	198.8	-
29	-07	0239	Mar 07	11:42:56	8229	-21779	T	a-	-0.4203	2.0973	1.0764	333.9	202.9	42.5
30	-06	0257	Mar 17	19:17:48	8057	-21556	T	a-	-0.3712	2.1841	1.1697	334.9	207.1	61.4
31	-05	0275	Mar 29	02:47:37	7884	-21333	T	a-	-0.3170	2.2804	1.2724	335.8	211.0	75.0
32	-04	0293	Apr 08	10:09:32	7711	-21110	T-	p-	-0.2551	2.3909	1.3890	336.6	214.5	85.7
33	-03	0311	Apr 19	17:28:26	7536	-20887	T-	p-	-0.1896	2.5080	1.5119	336.9	217.2	93.5
34	-02	0329	Apr 30	00:42:02	7361	-20664	T-	pp	-0.1190	2.6349	1.6442	336.8	219.0	98.8
35	-01	0347	May 11	07:53:39	7186	-20441	T-	pp	-0.0456	2.7671	1.7813	336.0	219.7	101.5
36	00	0365	May 21	15:02:52	7009	-20218	T+	pp	0.0306	2.7924	1.8108	334.5	219.2	101.6
37	01	0383	Jun 01	22:12:39	6832	-19995	T+	pp	0.1073	2.6499	1.6721	332.3	217.5	99.1
38	02	0401	Jun 12	05:23:31	6654	-19772	T+	pp	0.1840	2.5076	1.5329	329.4	214.5	93.6
39	03	0419	Jun 23	12:36:11	6475	-19549	T+	-p	0.2600	2.3669	1.3947	325.8	210.3	84.8
40	04	0437	Jul 03	19:53:18	6297	-19326	T	-p	0.3328	2.2323	1.2620	321.6	205.1	72.2
41	05	0455	Jul 15	03:14:53	6119	-19103	T	-p	0.4025	2.1038	1.1349	317.0	198.8	53.9
42	06	0473	Jul 25	10:42:42	5941	-18880	T	-a	0.4675	1.9840	1.0159	312.0	191.8	19.1
43	07	0491	Aug 05	18:16:35	5765	-18657	P	-a	0.5281	1.8727	0.9048	306.8	184.2	-
44	08	0509	Aug 16	01:58:44	5588	-18434	P	-a	0.5824	1.7732	0.8051	301.7	176.4	-
45	09	0527	Aug 27	09:48:54	5411	-18211	P	-a	0.6303	1.6857	0.7170	296.8	168.5	-
46	10	0545	Sep 06	17:47:10	5236	-17988	P	-a	0.6719	1.6097	0.6402	292.2	160.9	-
47	11	0563	Sep 18	01:54:29	5062	-17765	P	-a	0.7065	1.5466	0.5761	288.1	153.9	-
48	12	0581	Sep 28	10:10:51	4889	-17542	P	-a	0.7344	1.4960	0.5244	284.6	147.7	-
49	13	0599	Oct 09	18:35:43	4718	-17319	P	-a	0.7556	1.4576	0.4850	281.8	142.7	-
50	14	0617	Oct 20	03:07:47	4548	-17096	P	-a	0.7714	1.4291	0.4555	279.6	138.7	-
51	15	0635	Oct 31	11:46:53	4379	-16873	P	-a	0.7819	1.4101	0.4359	278.0	135.8	-
52	16	0653	Nov 10	20:32:02	4212	-16650	P	-a	0.7881	1.3990	0.4243	276.9	134.1	-
53	17	0671	Nov 22	05:20:49	4047	-16427	P	-a	0.7918	1.3922	0.4175	276.2	133.0	-

54	18	0689	Dec 02	14:12:58	3883	-16204	P	-a	0.7932	1.3896	0.4152	275.7	132.5	-
55	19	0707	Dec 13	23:05:35	3722	-15981	P	-a	0.7948	1.3863	0.4127	275.2	132.1	-
56	20	0725	Dec 24	07:58:42	3563	-15758	P	-a	0.7960	1.3834	0.4110	274.7	131.8	-
57	21	0744	Jan 04	16:47:56	3406	-15535	P	-a	0.8009	1.3735	0.4028	273.8	130.5	-
58	22	0762	Jan 15	01:35:12	3253	-15312	P	-a	0.8077	1.3601	0.3915	272.6	128.9	-
59	23	0780	Jan 26	10:16:16	3102	-15089	P	-a	0.8200	1.3363	0.3700	270.8	125.7	-
60	24	0798	Feb 05	18:52:02	2954	-14866	P	-a	0.8368	1.3042	0.3405	268.3	121.1	-
61	25	0816	Feb 17	03:19:25	2809	-14643	P	-a	0.8606	1.2592	0.2982	264.8	114.0	-
62	26	0834	Feb 27	11:40:48	2668	-14420	P	-a	0.8895	1.2048	0.2465	260.5	104.4	-
63	27	0852	Mar 09	19:53:32	2531	-14197	P	-a	0.9258	1.1368	0.1812	254.9	90.4	-
64	28	0870	Mar 21	03:58:24	2398	-13974	P	-a	0.9687	1.0569	0.1037	247.9	69.2	-
65	29	0888	Mar 31	11:55:10	2268	-13751	P	-a	1.0182	0.9649	0.0139	239.2	25.6	-
66	30	0906	Apr 11	19:45:25	2143	-13528	N	-a	1.0731	0.8633	-0.0859	228.8	-	-
67	31	0924	Apr 22	03:28:25	2022	-13305	N	-a	1.1338	0.7511	-0.1967	216.1	-	-
68	32	0942	May 03	11:05:37	1905	-13082	N	-a	1.1993	0.6305	-0.3165	200.6	-	-
69	33	0960	May 13	18:37:52	1793	-12859	N	-a	1.2685	0.5034	-0.4433	181.7	-	-
70	34	0978	May 25	02:06:44	1685	-12636	N	-a	1.3399	0.3725	-0.5745	158.5	-	-
71	35	0996	Jun 04	09:31:24	1582	-12413	N	-a	1.4143	0.2367	-0.7114	128.2	-	-
72	36	1014	Jun 15	16:55:18	1484	-12190	Ne	-a	1.4887	0.1009	-0.8488	84.9	-	-

SAROS SERIES

76

Saros series 76 contains 73 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-37	-0255 Apr 07	04:28:52	13415	-27888	Nb a-	1.5485	0.0038	-0.9710	17.2	-	-		
02	-36	-0237 Apr 18	11:55:04	13185	-27665	N a-	1.4822	0.1230	-0.8468	95.6	-	-		
03	-35	-0219 Apr 28	19:18:20	12960	-27442	N a-	1.4127	0.2482	-0.7172	133.7	-	-		
04	-34	-0201 May 10	02:37:30	12740	-27219	N a-	1.3390	0.3816	-0.5799	163.2	-	-		
05	-33	-0183 May 20	09:56:45	12524	-26996	N a-	1.2643	0.5169	-0.4412	186.9	-	-		
06	-32	-0165 May 31	17:15:02	12312	-26773	N a-	1.1880	0.6557	-0.2998	207.0	-	-		
07	-31	-0147 Jun 11	00:34:33	12104	-26550	N a-	1.1117	0.7946	-0.1589	224.1	-	-		
08	-30	-0129 Jun 22	07:56:30	11899	-26327	N a-	1.0367	0.9316	-0.0205	238.6	-	-		
09	-29	-0111 Jul 02	15:22:15	11698	-26104	P a-	0.9640	1.0646	0.1132	250.9	72.9	-		
10	-28	-0093 Jul 13	22:52:38	11501	-25881	P a-	0.8947	1.1917	0.2404	261.3	104.1	-		
11	-27	-0075 Jul 24	06:27:59	11307	-25658	P a-	0.8291	1.3123	0.3605	270.0	125.1	-		
12	-26	-0057 Aug 04	14:10:32	11115	-25435	P a-	0.7690	1.4230	0.4702	277.3	140.4	-		
13	-25	-0039 Aug 14	22:00:16	10927	-25212	P a-	0.7145	1.5238	0.5696	283.2	151.9	-		
14	-24	-0021 Aug 26	05:57:19	10741	-24989	P a-	0.6660	1.6137	0.6577	288.1	160.8	-		
15	-23	-0003 Sep 05	14:03:00	10558	-24766	P a-	0.6245	1.6909	0.7329	291.9	167.5	-		
16	-22	0015 Sep 16	22:17:02	10376	-24543	P a-	0.5899	1.7555	0.7953	294.9	172.5	-		

17	-21	0033	Sep 27	06:39:46	10197	-24320	P	a-	0.5624	1.8071	0.8446	297.2	176.2	-
18	-20	0051	Oct 08	15:08:47	10020	-24097	P	a-	0.5398	1.8496	0.8849	299.1	178.9	-
19	-19	0069	Oct 18	23:46:12	9844	-23874	P	a-	0.5243	1.8791	0.9123	300.3	180.7	-
20	-18	0087	Oct 30	08:28:59	9669	-23651	P	a-	0.5134	1.9000	0.9314	301.2	182.0	-
21	-17	0105	Nov 09	17:17:35	9496	-23428	P	a-	0.5072	1.9121	0.9421	301.8	182.6	-
22	-16	0123	Nov 21	02:08:23	9324	-23205	P	a-	0.5030	1.9204	0.9493	302.3	183.1	-
23	-15	0141	Dec 01	11:02:25	9152	-22982	P	a-	0.5016	1.9234	0.9516	302.5	183.3	-
24	-14	0159	Dec 12	19:56:04	8981	-22759	P	a-	0.4999	1.9265	0.9545	302.8	183.5	-
25	-13	0177	Dec 23	04:48:32	8810	-22536	P	a-	0.4978	1.9304	0.9585	303.0	183.9	-
26	-12	0196	Jan 03	13:37:39	8639	-22313	P	a-	0.4931	1.9387	0.9675	303.5	184.6	-
27	-11	0214	Jan 13	22:22:45	8468	-22090	P	a-	0.4855	1.9521	0.9818	304.2	185.6	-
28	-10	0232	Jan 25	07:01:26	8296	-21867	T	a-	0.4729	1.9745	1.0055	305.2	187.3	11.0
29	-09	0250	Feb 04	15:33:17	8125	-21644	T	p-	0.4551	2.0065	1.0390	306.6	189.4	29.1
30	-08	0268	Feb 15	23:57:16	7952	-21421	T	p-	0.4311	2.0497	1.0836	308.4	192.1	42.2
31	-07	0286	Feb 26	08:13:46	7779	-21198	T	p-	0.4015	2.1033	1.1387	310.4	195.2	53.5
32	-06	0304	Mar 08	16:20:17	7605	-20975	T	p-	0.3638	2.1717	1.2086	312.8	198.7	64.3
33	-05	0322	Mar 20	00:19:18	7431	-20752	T	p-	0.3203	2.2511	1.2891	315.3	202.4	73.9
34	-04	0340	Mar 30	08:09:22	7255	-20529	T+	p-	0.2695	2.3438	1.3827	317.9	206.0	82.4
35	-03	0358	Apr 10	15:52:56	7079	-20306	T+	p-	0.2138	2.4458	1.4851	320.3	209.3	89.5
36	-02	0376	Apr 20	23:27:30	6902	-20083	T+	pp	0.1510	2.5610	1.6003	322.6	212.1	95.1
37	-01	0394	May 02	06:57:39	6724	-19860	T+	pp	0.0850	2.6825	1.7213	324.5	214.2	98.9
38	00	0412	May 12	14:21:02	6546	-19637	T+	pp	0.0135	2.8142	1.8519	325.9	215.5	100.6
39	01	0430	May 23	21:41:13	6367	-19414	T-	pp	-0.0599	2.7298	1.7659	326.7	215.7	100.1
40	02	0448	Jun 03	04:56:53	6189	-19191	T-	p-	-0.1365	2.5905	1.6242	326.9	214.6	96.8
41	03	0466	Jun 14	12:12:10	6011	-18968	T-	p-	-0.2126	2.4523	1.4831	326.3	212.3	90.5
42	04	0484	Jun 24	19:26:05	5834	-18745	T	p-	-0.2892	2.3137	1.3407	324.9	208.7	80.4
43	05	0502	Jul 06	02:40:41	5658	-18522	T	-a	-0.3643	2.1778	1.2008	322.9	203.8	64.9
44	06	0520	Jul 16	09:57:30	5481	-18299	T	-a	-0.4368	2.0473	1.0655	320.2	197.5	38.7

45	07	0538	Jul 27	17:17:25	5305	-18076	P	-a	-0.5058	1.9232	0.9363	317.0	190.2	-
46	08	0556	Aug 07	00:41:59	5130	-17853	P	-a	-0.5701	1.8082	0.8156	313.5	181.8	-
47	09	0574	Aug 18	08:10:53	4957	-17630	P	-a	-0.6298	1.7016	0.7030	309.7	172.5	-
48	10	0592	Aug 28	15:47:05	4785	-17407	P	-a	-0.6828	1.6075	0.6026	306.0	162.9	-
49	11	0610	Sep 08	23:29:23	4615	-17184	P	-a	-0.7301	1.5240	0.5127	302.4	152.9	-
50	12	0628	Sep 19	07:19:11	4445	-16961	P	-a	-0.7702	1.4536	0.4359	299.2	143.1	-
51	13	0646	Sep 30	15:15:57	4278	-16738	P	-a	-0.8039	1.3949	0.3709	296.5	133.7	-
52	14	0664	Oct 10	23:20:38	4112	-16515	P	-a	-0.8303	1.3496	0.3196	294.5	125.4	-
53	15	0682	Oct 22	07:31:05	3947	-16292	P	-a	-0.8513	1.3140	0.2781	293.1	118.1	-
54	16	0700	Nov 01	15:46:52	3785	-16069	P	-a	-0.8673	1.2874	0.2461	292.2	111.9	-
55	17	0718	Nov 13	00:07:06	3625	-15846	P	-a	-0.8788	1.2687	0.2226	291.9	107.1	-
56	18	0736	Nov 23	08:31:02	3468	-15623	P	-a	-0.8861	1.2575	0.2071	292.1	103.8	-
57	19	0754	Dec 04	16:55:33	3313	-15400	P	-a	-0.8924	1.2476	0.1936	292.4	100.9	-
58	20	0772	Dec 15	01:20:14	3161	-15177	P	-a	-0.8978	1.2394	0.1824	292.7	98.4	-
59	21	0790	Dec 26	09:42:21	3012	-14954	P	-a	-0.9044	1.2283	0.1691	292.8	95.2	-
60	22	0809	Jan 05	18:01:57	2866	-14731	P	-a	-0.9123	1.2147	0.1538	292.5	91.2	-
61	23	0827	Jan 17	02:14:19	2724	-14508	P	-a	-0.9251	1.1918	0.1298	291.4	84.3	-
62	24	0845	Jan 27	10:21:40	2585	-14285	P	-h	-0.9412	1.1625	0.1000	289.5	74.5	-
63	25	0863	Feb 07	18:19:18	2450	-14062	P	-h	-0.9644	1.1199	0.0573	286.2	56.9	-
64	26	0881	Feb 18	02:09:41	2319	-13839	P	-h	-0.9928	1.0677	0.0053	281.8	17.5	-
65	27	0899	Mar 01	09:48:18	2192	-13616	N	-t	-1.0300	0.9993	-0.0627	275.3	-	-
66	28	0917	Mar 11	17:18:47	2069	-13393	N	-t	-1.0729	0.9202	-0.1412	267.0	-	-
67	29	0935	Mar 23	00:37:35	1951	-13170	N	-t	-1.1244	0.8255	-0.2353	256.0	-	-
68	30	0953	Apr 02	07:47:11	1837	-12947	N	-t	-1.1824	0.7187	-0.3415	241.9	-	-
69	31	0971	Apr 13	14:46:11	1727	-12724	N	-t	-1.2481	0.5979	-0.4619	223.8	-	-
70	32	0989	Apr 23	21:37:46	1622	-12501	N	-t	-1.3188	0.4681	-0.5914	200.9	-	-
71	33	1007	May 05	04:21:00	1522	-12278	N	-t	-1.3951	0.3281	-0.7315	170.8	-	-
72	34	1025	May 15	10:57:37	1427	-12055	N	-t	-1.4754	0.1809	-0.8790	128.8	-	-

SAROS SERIES

77

Saros series 77 contains 72 lunar eclipses.

													PHASE
													DURATIONS
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-36	-0190 Apr 09 11:10:50	12609 -27084	Nb	a-	-1.5269	0.0466	-0.9344	59.9	-	-		
02	-35	-0172 Apr 19 18:34:28	12395 -26861	N	a-	-1.4686	0.1541	-0.8280	108.3	-	-		
03	-34	-0154 May 01 01:50:19	12185 -26638	N	h-	-1.4048	0.2719	-0.7116	142.8	-	-		
04	-33	-0136 May 11 09:02:06	11979 -26415	N	h-	-1.3381	0.3954	-0.5903	170.9	-	-		
05	-32	-0118 May 22 16:07:23	11777 -26192	N	h-	-1.2668	0.5275	-0.4608	195.7	-	-		
06	-31	-0100 Jun 01 23:11:44	11578 -25969	N	h-	-1.1954	0.6602	-0.3313	217.0	-	-		
07	-30	-0082 Jun 13 06:12:46	11383 -25746	N	t-	-1.1223	0.7963	-0.1990	236.1	-	-		
08	-29	-0064 Jun 23 13:14:32	11190 -25523	N	t-	-1.0505	0.9303	-0.0694	252.9	-	-		

09	-28	-0046	Jul 04	20:15:49	11001	-25300	P	t-	-0.9789	1.0641	0.0595	267.9	56.1	-
10	-27	-0028	Jul 15	03:20:42	10814	-25077	P	t-	-0.9111	1.1912	0.1812	280.9	96.6	-
11	-26	-0010	Jul 26	10:28:25	10630	-24854	P	t-	-0.8465	1.3127	0.2969	292.3	122.0	-
12	-25	0008	Aug 05	17:40:45	10448	-24631	P	t-	-0.7865	1.4259	0.4039	302.2	140.5	-
13	-24	0026	Aug 17	00:58:51	10268	-24408	P	t-	-0.7322	1.5288	0.5005	310.7	154.6	-
14	-23	0044	Aug 27	08:23:54	10090	-24185	P	t-	-0.6843	1.6199	0.5850	317.9	165.4	-
15	-22	0062	Sep 07	15:56:02	9913	-23962	P	t-	-0.6428	1.6993	0.6579	324.0	173.8	-
16	-21	0080	Sep 17	23:35:36	9738	-23739	P	t-	-0.6082	1.7661	0.7182	329.1	180.3	-
17	-20	0098	Sep 29	07:22:36	9564	-23516	P	t-	-0.5804	1.8203	0.7661	333.4	185.2	-
18	-19	0116	Oct 09	15:17:08	9392	-23293	P	t-	-0.5594	1.8617	0.8016	336.9	188.8	-
19	-18	0134	Oct 20	23:16:55	9220	-23070	P	t-	-0.5435	1.8937	0.8281	339.8	191.5	-
20	-17	0152	Oct 31	07:23:25	9048	-22847	P	t-	-0.5336	1.9145	0.8439	342.1	193.2	-
21	-16	0170	Nov 11	15:33:27	8877	-22624	P	t-	-0.5269	1.9289	0.8539	344.1	194.5	-
22	-15	0188	Nov 21	23:47:05	8706	-22401	P	t-	-0.5240	1.9361	0.8575	345.6	195.2	-
23	-14	0206	Dec 03	07:59:57	8535	-22178	P	t-	-0.5211	1.9430	0.8615	347.0	196.0	-
24	-13	0224	Dec 13	16:13:39	8364	-21955	P	t-	-0.5194	1.9471	0.8635	348.1	196.6	-
25	-12	0242	Dec 25	00:23:45	8192	-21732	P	t-	-0.5150	1.9558	0.8707	349.4	197.6	-
26	-11	0261	Jan 04	08:29:58	8020	-21509	P	t-	-0.5081	1.9688	0.8831	350.8	198.9	-
27	-10	0279	Jan 15	16:29:20	7847	-21286	P	t-	-0.4961	1.9910	0.9051	352.5	201.0	-
28	-09	0297	Jan 26	00:22:08	7674	-21063	P	t-	-0.4791	2.0218	0.9366	354.4	203.7	-
29	-08	0315	Feb 06	08:06:11	7500	-20840	P	t-	-0.4553	2.0650	0.9807	356.6	207.1	-
30	-07	0333	Feb 16	15:40:44	7324	-20617	T	t-	-0.4241	2.1215	1.0387	359.2	211.2	31.9
31	-06	0351	Feb 27	23:05:34	7148	-20394	T	t-	-0.3851	2.1922	1.1110	362.1	215.7	53.0
32	-05	0369	Mar 10	06:20:35	6972	-20171	T	p-	-0.3386	2.2767	1.1973	365.0	220.4	68.7
33	-04	0387	Mar 21	13:25:12	6794	-19948	T	pp	-0.2838	2.3763	1.2989	367.9	225.1	81.7
34	-03	0405	Mar 31	20:20:38	6616	-19725	T-	pp	-0.2216	2.4895	1.4139	370.5	229.3	92.1
35	-02	0423	Apr 12	03:07:14	6438	-19502	T-	pp	-0.1525	2.6154	1.5416	372.6	232.7	99.9
36	-01	0441	Apr 22	09:46:51	6259	-19279	T-	pp	-0.0778	2.7516	1.6793	374.1	235.1	104.8

37	00	0459	May 03	16:18:09	6081	-19056	T+	pp	0.0033	2.8877	1.8167	374.6	236.0	106.5	
38	01	0477	May 13	22:45:17	5904	-18833	T+	pp	0.0875	2.7327	1.6627	374.1	235.2	104.6	
39	02	0495	May 25	05:07:40	5727	-18610	T+	pp	0.1752	2.5715	1.5022	372.4	232.6	98.2	
40	03	0513	Jun 04	11:29:13	5550	-18387	T+	pp	0.2636	2.4091	1.3401	369.5	227.8	86.4	
41	04	0531	Jun 15	17:48:24	5374	-18164	T	-t	0.3536	2.2440	1.1749	365.2	220.8	65.8	
42	05	0549	Jun 26	00:10:45	5199	-17941	T	-t	0.4409	2.0839	1.0144	359.8	211.7	19.9	
43	06	0567	Jul 07	06:34:55	5025	-17718	P	-t	0.5263	1.9277	0.8573	353.2	200.3	-	
44	07	0585	Jul 17	13:04:06	4853	-17495	P	-t	0.6076	1.7791	0.7076	345.7	186.6	-	
45	08	0603	Jul 28	19:38:19	4682	-17272	P	-t	0.6849	1.6380	0.5650	337.3	170.6	-	
46	09	0621	Aug 08	02:20:49	4512	-17049	P	-t	0.7556	1.5091	0.4345	328.6	152.6	-	
47	10	0639	Aug 19	09:11:47	4344	-16826	P	-t	0.8194	1.3930	0.3166	319.8	132.5	-	
48	11	0657	Aug 29	16:11:01	4177	-16603	P	-t	0.8767	1.2888	0.2106	310.9	109.6	-	
49	12	0675	Sep 09	23:21:02	4012	-16380	P	-t	0.9254	1.2004	0.1203	302.7	83.8	-	
50	13	0693	Sep 20	06:40:41	3849	-16157	P	-t	0.9666	1.1256	0.0438	295.2	51.0	-	
51	14	0711	Oct 01	14:11:14	3688	-15934	Nx	-t	0.9994	1.0661	-0.0173	288.8	-	-	
52	15	0729	Oct 11	21:49:56	3530	-15711	Nx	-t	1.0260	1.0180	-0.0666	283.2	-	-	
53	16	0747	Oct 23	05:38:53	3374	-15488	N	-t	1.0447	0.9841	-0.1013	279.0	-	-	
54	17	0765	Nov 02	13:34:44	3221	-15265	N	-t	1.0583	0.9594	-0.1264	275.6	-	-	
55	18	0783	Nov 13	21:37:37	3070	-15042	N	-t	1.0667	0.9438	-0.1417	273.2	-	-	
56	19	0801	Nov 24	05:45:07	2923	-14819	N	-t	1.0719	0.9336	-0.1508	271.4	-	-	
57	20	0819	Dec 05	13:57:15	2779	-14596	N	-t	1.0742	0.9286	-0.1541	270.1	-	-	
58	21	0837	Dec 15	22:10:08	2639	-14373	N	-t	1.0763	0.9235	-0.1568	268.7	-	-	
59	22	0855	Dec 27	06:23:14	2503	-14150	N	-t	1.0789	0.9172	-0.1599	267.1	-	-	
60	23	0874	Jan 06	14:34:28	2370	-13927	N	-t	1.0837	0.9064	-0.1668	264.9	-	-	
61	24	0892	Jan 17	22:43:39	2241	-13704	N	-t	1.0911	0.8904	-0.1782	262.1	-	-	
62	25	0910	Jan 28	06:46:30	2117	-13481	N	-t	1.1043	0.8636	-0.1998	257.8	-	-	
63	26	0928	Feb 08	14:45:03	1997	-13258	N	-t	1.1216	0.8291	-0.2287	252.4	-	-	
64	27	0946	Feb 18	22:35:45	1881	-13035	N	-t	1.1459	0.7814	-0.2704	245.2	-	-	

65	28	0964	Mar 01	06:21:13	1770 -12812	N	-t	1.1752	0.7245	-0.3210	236.4	-	-
66	29	0982	Mar 12	13:56:56	1663 -12589	N	-t	1.2130	0.6518	-0.3873	224.8	-	-
67	30	1000	Mar 22	21:27:53	1561 -12366	N	-t	1.2555	0.5707	-0.4620	211.0	-	-
68	31	1018	Apr 03	04:50:06	1464 -12143	N	-t	1.3052	0.4762	-0.5501	193.6	-	-
69	32	1036	Apr 13	12:07:45	1371 -11920	N	-t	1.3593	0.3738	-0.6463	172.4	-	-
70	33	1054	Apr 24	19:18:25	1283 -11697	N	-t	1.4195	0.2604	-0.7538	144.7	-	-
71	34	1072	May 05	02:26:49	1199 -11474	N	-t	1.4820	0.1429	-0.8658	107.8	-	-
72	35	1090	May 16	09:30:58	1120 -11251	Ne	-t	1.5484	0.0186	-0.9850	39.2	-	-

SAROS SERIES

78

Saros series 78 contains 72 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-34	-0125	Apr 10	15:04:46	11857 -26280	Nb	t-	1.5505	0.0507	-1.0242	69.9	-	-	

02	-33	-0107	Apr 20	21:38:22	11656	-26057	N	t-	1.4755	0.1868	-0.8850	132.4	-	-
03	-32	-0089	May 02	04:07:43	11460	-25834	N	t-	1.3963	0.3307	-0.7383	173.7	-	-
04	-31	-0071	May 12	10:32:34	11266	-25611	N	t-	1.3125	0.4831	-0.5833	206.6	-	-
05	-30	-0053	May 23	16:56:42	11075	-25388	N	t-	1.2273	0.6384	-0.4260	233.6	-	-
06	-29	-0035	Jun 02	23:18:12	10887	-25165	N	t-	1.1391	0.7994	-0.2632	256.8	-	-
07	-28	-0017	Jun 14	05:43:03	10702	-24942	N	t-	1.0524	0.9577	-0.1036	276.0	-	-
08	-27	0001	Jun 24	12:08:47	10519	-24719	P	t-	0.9653	1.1170	0.0567	292.5	57.9	-
09	-26	0019	Jul 05	18:40:32	10338	-24496	P	t-	0.8822	1.2693	0.2096	306.0	108.8	-
10	-25	0037	Jul 16	01:16:00	10160	-24273	P	t-	0.8011	1.4179	0.3584	317.4	138.8	-
11	-24	0055	Jul 27	08:01:10	9983	-24050	P	t-	0.7267	1.5545	0.4949	326.3	159.4	-
12	-23	0073	Aug 06	14:53:14	9807	-23827	P	t-	0.6568	1.6829	0.6230	333.6	174.7	-
13	-22	0091	Aug 17	21:55:26	9633	-23604	P	t-	0.5941	1.7983	0.7378	339.2	186.1	-
14	-21	0109	Aug 28	05:07:04	9460	-23381	P	t-	0.5383	1.9011	0.8399	343.4	194.5	-
15	-20	0127	Sep 08	12:30:19	9287	-23158	P	t-	0.4912	1.9879	0.9261	346.4	200.6	-
16	-19	0145	Sep 18	20:03:29	9116	-22935	P	t-	0.4511	2.0618	0.9994	348.4	205.0	-
17	-18	0163	Sep 30	03:46:43	8945	-22712	T	h-	0.4183	2.1220	1.0592	349.7	208.1	38.6
18	-17	0181	Oct 10	11:39:46	8774	-22489	T	a-	0.3929	2.1688	1.1059	350.3	210.2	50.7
19	-16	0199	Oct 21	19:42:04	8603	-22266	T	a-	0.3744	2.2027	1.1400	350.4	211.4	57.5
20	-15	0217	Nov 01	03:51:19	8432	-22043	T	a-	0.3609	2.2270	1.1651	350.1	212.0	61.7
21	-14	0235	Nov 12	12:07:20	8260	-21820	T	a-	0.3524	2.2419	1.1813	349.4	212.2	64.2
22	-13	0253	Nov 22	20:27:42	8088	-21597	T	p-	0.3467	2.2513	1.1927	348.5	212.2	65.7
23	-12	0271	Dec 04	04:51:46	7916	-21374	T	p-	0.3434	2.2561	1.2000	347.4	211.9	66.7
24	-11	0289	Dec 14	13:15:32	7743	-21151	T	p-	0.3392	2.2621	1.2093	346.2	211.8	67.8
25	-10	0307	Dec 25	21:40:21	7569	-20928	T	p-	0.3352	2.2676	1.2187	345.0	211.6	69.0
26	-09	0326	Jan 05	06:02:03	7394	-20705	T	p-	0.3282	2.2780	1.2337	343.8	211.7	70.8
27	-08	0344	Jan 16	14:20:47	7218	-20482	T	p-	0.3178	2.2946	1.2555	342.7	212.1	73.3
28	-07	0362	Jan 26	22:33:23	7041	-20259	T	p-	0.3014	2.3218	1.2882	341.8	212.8	76.8
29	-06	0380	Feb 07	06:41:29	6864	-20036	T	p-	0.2806	2.3569	1.3293	341.0	213.8	80.8

30	-05	0398	Feb 17	14:42:35	6686	-19813	T+	p-	0.2533	2.4039	1.3825	340.3	215.0	85.2
31	-04	0416	Feb 28	22:36:15	6508	-19590	T+	p-	0.2190	2.4637	1.4487	339.7	216.3	89.8
32	-03	0434	Mar 11	06:23:02	6330	-19367	T+	p-	0.1781	2.5354	1.5269	339.1	217.6	94.1
33	-02	0452	Mar 21	14:02:47	6151	-19144	T+	p-	0.1304	2.6198	1.6176	338.4	218.8	97.8
34	-01	0470	Apr 01	21:36:16	5974	-18921	T+	pp	0.0768	2.7151	1.7190	337.5	219.4	100.4
35	00	0488	Apr 12	05:03:16	5797	-18698	T+	pp	0.0170	2.8218	1.8317	336.2	219.5	101.6
36	01	0506	Apr 23	12:25:55	5620	-18475	T-	pp	-0.0474	2.7633	1.7786	334.4	218.8	101.1
37	02	0524	May 03	19:44:18	5444	-18252	T-	pp	-0.1162	2.6345	1.6548	332.1	217.1	98.4
38	03	0542	May 15	02:59:39	5268	-18029	T-	pp	-0.1884	2.4998	1.5246	329.1	214.2	93.1
39	04	0560	May 25	10:13:38	5094	-17806	T-	p-	-0.2624	2.3619	1.3906	325.4	210.1	84.5
40	05	0578	Jun 05	17:27:34	4921	-17583	T	p-	-0.3375	2.2225	1.2545	320.9	204.7	71.3
41	06	0596	Jun 16	00:43:12	4749	-17360	T	-a	-0.4119	2.0847	1.1194	315.8	198.0	50.9
42	07	0614	Jun 27	08:00:24	4579	-17137	P	-a	-0.4858	1.9481	0.9848	310.0	189.9	-
43	08	0632	Jul 07	15:22:21	4410	-16914	P	-a	-0.5564	1.8177	0.8559	303.8	180.6	-
44	09	0650	Jul 18	22:48:17	4243	-16691	P	-a	-0.6247	1.6920	0.7310	297.0	170.1	-
45	10	0668	Jul 29	06:20:47	4077	-16468	P	-a	-0.6879	1.5759	0.6153	290.1	158.6	-
46	11	0686	Aug 09	13:59:05	3913	-16245	P	-a	-0.7469	1.4677	0.5068	283.0	146.1	-
47	12	0704	Aug 19	21:46:01	3751	-16022	P	-a	-0.7994	1.3717	0.4102	276.2	133.1	-
48	13	0722	Aug 31	05:40:33	3592	-15799	P	-a	-0.8462	1.2864	0.3239	269.7	119.6	-
49	14	0740	Sep 10	13:43:12	3435	-15576	P	-a	-0.8867	1.2126	0.2490	263.6	105.8	-
50	15	0758	Sep 21	21:54:44	3281	-15353	P	-a	-0.9203	1.1518	0.1866	258.4	92.3	-
51	16	0776	Oct 02	06:14:18	3129	-15130	P	-a	-0.9474	1.1027	0.1361	253.9	79.2	-
52	17	0794	Oct 13	14:42:25	2981	-14907	P	-a	-0.9682	1.0653	0.0972	250.3	67.2	-
53	18	0812	Oct 23	23:16:18	2836	-14684	P	-a	-0.9846	1.0358	0.0664	247.4	55.7	-
54	19	0830	Nov 04	07:57:58	2694	-14461	P	-a	-0.9950	1.0173	0.0467	245.5	46.8	-
55	20	0848	Nov 14	16:43:54	2556	-14238	P	-a	-1.0022	1.0046	0.0333	244.2	39.6	-
56	21	0866	Nov 26	01:34:40	2422	-14015	P	-a	-1.0058	0.9982	0.0264	243.4	35.3	-
57	22	0884	Dec 06	10:26:38	2292	-13792	P	-a	-1.0085	0.9931	0.0213	242.8	31.7	-

58	23	0902 Dec 17	19:20:33	2165 -13569	P	-a	-1.0103	0.9897	0.0184	242.4	29.4	-
59	24	0920 Dec 28	04:12:44	2044 -13346	P	-a	-1.0135	0.9833	0.0129	241.7	24.6	-
60	25	0939 Jan 08	13:02:53	1926 -13123	P	-a	-1.0187	0.9733	0.0041	240.6	13.8	-
61	26	0957 Jan 18	21:48:41	1813 -12900	N	-a	-1.0274	0.9564	-0.0112	238.9	-	-
62	27	0975 Jan 30	06:30:05	1705 -12677	N	-a	-1.0398	0.9327	-0.0330	236.4	-	-
63	28	0993 Feb 09	15:03:57	1601 -12454	N	-a	-1.0584	0.8974	-0.0662	232.8	-	-
64	29	1011 Feb 20	23:31:12	1502 -12231	N	-a	-1.0827	0.8518	-0.1096	227.8	-	-
65	30	1029 Mar 03	07:49:56	1407 -12008	N	-a	-1.1137	0.7937	-0.1654	221.3	-	-
66	31	1047 Mar 14	16:02:02	1317 -11785	N	-a	-1.1500	0.7260	-0.2310	213.2	-	-
67	32	1065 Mar 25	00:03:44	1232 -11562	N	-a	-1.1947	0.6431	-0.3121	202.5	-	-
68	33	1083 Apr 05	07:59:31	1151 -11339	N	-a	-1.2441	0.5516	-0.4019	189.4	-	-
69	34	1101 Apr 15	15:46:10	1074 -11116	N	-a	-1.3010	0.4467	-0.5056	172.3	-	-
70	35	1119 Apr 26	23:28:02	1002 -10893	N	-a	-1.3613	0.3356	-0.6158	151.2	-	-
71	36	1137 May 07	07:01:23	934 -10670	N	-a	-1.4281	0.2128	-0.7384	121.9	-	-
72	37	1155 May 18	14:32:01	870 -10447	Ne	-a	-1.4969	0.0869	-0.8647	79.0	-	-

SAROS SERIES

79

Saros series 79 contains 73 lunar eclipses.

													PHASE
													DURATIONS
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-38	-0132 Feb 27	16:56:58	11936 -26368	N	a-	-1.5274	0.0488	-0.9383	61.0	-	-	
02	-37	-0114 Mar 10	00:51:25	11735 -26145	N	a-	-1.4834	0.1265	-0.8547	97.3	-	-	
03	-36	-0096 Mar 20	08:38:39	11537 -25922	N	a-	-1.4328	0.2165	-0.7591	125.7	-	-	
04	-35	-0078 Mar 31	16:18:47	11342 -25699	N	a-	-1.3758	0.3184	-0.6518	150.5	-	-	
05	-34	-0060 Apr 10	23:53:20	11150 -25476	N	a-	-1.3136	0.4301	-0.5353	172.4	-	-	
06	-33	-0042 Apr 22	07:23:08	10961 -25253	N	a-	-1.2470	0.5500	-0.4108	192.1	-	-	
07	-32	-0024 May 02	14:48:42	10775 -25030	N	a-	-1.1763	0.6778	-0.2791	209.9	-	-	
08	-31	-0006 May 13	22:11:34	10591 -24807	N	a-	-1.1026	0.8114	-0.1422	225.9	-	-	
09	-30	0012 May 24	05:33:04	10410 -24584	N	a-	-1.0272	0.9484	-0.0025	240.1	-	-	
10	-29	0030 Jun 04	12:55:00	10230 -24361	P	a-	-0.9517	1.0859	0.1371	252.5	79.9	-	
11	-28	0048 Jun 14	20:16:49	10052 -24138	P	a-	-0.8754	1.2251	0.2777	263.6	111.3	-	
12	-27	0066 Jun 26	03:41:56	9876 -23915	P	a-	-0.8015	1.3604	0.4137	273.0	133.0	-	
13	-26	0084 Jul 06	11:09:43	9701 -23692	P	a-	-0.7294	1.4926	0.5459	281.1	149.5	-	
14	-25	0102 Jul 17	18:43:31	9528 -23469	P	a-	-0.6619	1.6167	0.6695	287.8	162.1	-	
15	-24	0120 Jul 28	02:21:13	9355 -23246	P	a-	-0.5974	1.7356	0.7874	293.6	172.2	-	
16	-23	0138 Aug 08	10:07:24	9184 -23023	P	a-	-0.5400	1.8418	0.8920	298.2	179.9	-	
17	-22	0156 Aug 18	17:59:30	9012 -22800	P	a-	-0.4873	1.9394	0.9876	301.9	186.0	-	
18	-21	0174 Aug 30	02:00:28	8841 -22577	T	a-	-0.4421	2.0236	1.0695	304.9	190.5	38.5	
19	-20	0192 Sep 09	10:08:08	8670 -22354	T	p-	-0.4024	2.0978	1.1410	307.4	194.0	53.6	
20	-19	0210 Sep 20	18:25:10	8499 -22131	T	p-	-0.3705	2.1576	1.1982	309.2	196.5	62.4	

21	-18	0228 Oct 01	02:49:12	8328 -21908	T	p-	-0.3448	2.2062	1.2439	310.7	198.4	68.1
22	-17	0246 Oct 12	11:20:31	8156 -21685	T	p-	-0.3253	2.2434	1.2785	311.9	199.7	71.9
23	-16	0264 Oct 22	19:58:27	7984 -21462	T	p-	-0.3114	2.2702	1.3027	312.8	200.6	74.3
24	-15	0282 Nov 03	04:42:37	7811 -21239	T	p-	-0.3025	2.2875	1.3179	313.5	201.2	75.8
25	-14	0300 Nov 13	13:30:59	7637 -21016	T	p-	-0.2975	2.2978	1.3262	314.0	201.5	76.5
26	-13	0318 Nov 24	22:22:06	7463 -20793	T	p-	-0.2947	2.3036	1.3305	314.5	201.8	76.9
27	-12	0336 Dec 05	07:14:42	7287 -20570	T	p-	-0.2934	2.3065	1.3324	314.8	202.0	77.2
28	-11	0354 Dec 16	16:07:47	7111 -20347	T	p-	-0.2924	2.3087	1.3340	315.2	202.2	77.4
29	-10	0372 Dec 27	00:58:10	6934 -20124	T	p-	-0.2893	2.3144	1.3396	315.7	202.6	77.9
30	-09	0391 Jan 07	09:46:04	6757 -19901	T	p-	-0.2842	2.3237	1.3490	316.3	203.1	78.8
31	-08	0409 Jan 17	18:28:20	6579 -19678	T	p-	-0.2746	2.3410	1.3669	317.0	204.0	80.4
32	-07	0427 Jan 29	03:05:30	6400 -19455	T-	p-	-0.2611	2.3653	1.3921	317.9	205.1	82.5
33	-06	0445 Feb 08	11:33:57	6222 -19232	T-	p-	-0.2406	2.4025	1.4302	319.0	206.6	85.4
34	-05	0463 Feb 19	19:55:45	6044 -19009	T-	p-	-0.2149	2.4490	1.4779	320.3	208.2	88.5
35	-04	0481 Mar 02	04:08:15	5866 -18786	T-	p-	-0.1818	2.5093	1.5392	321.7	210.0	91.9
36	-03	0499 Mar 13	12:12:02	5691 -18563	T-	pp	-0.1419	2.5820	1.6129	323.2	211.8	95.2
37	-02	0517 Mar 23	20:06:37	5513 -18340	T-	pp	-0.0949	2.6679	1.6995	324.6	213.5	98.0
38	-01	0535 Apr 04	03:53:12	5337 -18117	T-	pp	-0.0418	2.7651	1.7971	325.8	214.7	99.8
39	00	0553 Apr 14	11:31:59	5162 -17894	T+	pp	0.0174	2.8099	1.8418	326.7	215.4	100.4
40	01	0571 Apr 25	19:02:19	4989 -17671	T+	pp	0.0830	2.6897	1.7212	327.2	215.3	99.2
41	02	0589 May 06	02:27:11	4817 -17448	T+	-p	0.1525	2.5627	1.5932	327.1	214.2	95.6
42	03	0607 May 17	09:46:22	4646 -17225	T+	-p	0.2260	2.4287	1.4576	326.3	211.8	89.0
43	04	0625 May 27	17:01:46	4476 -17002	T	-a	0.3019	2.2905	1.3173	324.7	208.0	78.3
44	05	0643 Jun 08	00:13:30	4308 -16779	T	-a	0.3802	2.1483	1.1722	322.2	202.6	60.7
45	06	0661 Jun 18	07:24:37	4142 -16556	T	-a	0.4580	2.0071	1.0277	318.9	195.6	25.5
46	07	0679 Jun 29	14:35:07	3977 -16333	P	-a	0.5354	1.8672	0.8838	314.7	186.7	-
47	08	0697 Jul 09	21:45:56	3815 -16110	P	-a	0.6114	1.7299	0.7420	309.7	175.8	-
48	09	0715 Jul 21	04:59:07	3655 -15887	P	-a	0.6845	1.5984	0.6054	303.9	162.9	-

49	10	0733 Jul 31	12:15:44	3497 -15664	P	-a	0.7535	1.4746	0.4761	297.7	147.9	-
50	11	0751 Aug 11	19:37:11	3341 -15441	P	-a	0.8176	1.3600	0.3556	291.1	130.6	-
51	12	0769 Aug 22	03:03:05	3189 -15218	P	-a	0.8767	1.2546	0.2440	284.3	110.3	-
52	13	0787 Sep 02	10:36:12	3039 -14995	P	-a	0.9288	1.1623	0.1453	277.8	86.6	-
53	14	0805 Sep 12	18:15:42	2893 -14772	P	-a	0.9746	1.0815	0.0580	271.6	55.6	-
54	15	0823 Sep 24	02:02:13	2749 -14549	Nx	-a	1.0138	1.0128	-0.0171	266.1	-	-
55	16	0841 Oct 04	09:55:45	2610 -14326	N	-a	1.0463	0.9563	-0.0799	261.3	-	-
56	17	0859 Oct 15	17:56:26	2474 -14103	N	-a	1.0723	0.9116	-0.1307	257.4	-	-
57	18	0877 Oct 26	02:03:46	2342 -13880	N	-a	1.0920	0.8784	-0.1696	254.7	-	-
58	19	0895 Nov 06	10:15:12	2215 -13657	N	-a	1.1078	0.8521	-0.2011	252.6	-	-
59	20	0913 Nov 16	18:32:25	2091 -13434	N	-a	1.1181	0.8354	-0.2225	251.5	-	-
60	21	0931 Nov 28	02:51:41	1972 -13211	N	-a	1.1266	0.8219	-0.2400	250.7	-	-
61	22	0949 Dec 08	11:13:05	1857 -12988	N	-a	1.1325	0.8129	-0.2524	250.5	-	-
62	23	0967 Dec 19	19:32:11	1747 -12765	N	-a	1.1396	0.8011	-0.2669	249.8	-	-
63	24	0985 Dec 30	03:50:38	1641 -12542	N	-h	1.1466	0.7892	-0.2807	249.0	-	-
64	25	1004 Jan 10	12:03:58	1540 -12319	N	-h	1.1574	0.7701	-0.3012	247.1	-	-
65	26	1022 Jan 20	20:12:07	1444 -12096	N	-h	1.1715	0.7446	-0.3274	244.3	-	-
66	27	1040 Feb 01	04:12:21	1352 -11873	N	-h	1.1915	0.7080	-0.3641	239.7	-	-
67	28	1058 Feb 11	12:04:59	1265 -11650	N	-t	1.2167	0.6617	-0.4102	233.3	-	-
68	29	1076 Feb 22	19:47:44	1182 -11427	N	-t	1.2491	0.6018	-0.4695	224.3	-	-
69	30	1094 Mar 05	03:20:50	1104 -11204	N	-t	1.2887	0.5288	-0.5416	212.2	-	-
70	31	1112 Mar 15	10:43:34	1030 -10981	N	-t	1.3358	0.4419	-0.6275	195.9	-	-
71	32	1130 Mar 26	17:57:04	960 -10758	N	-t	1.3894	0.3430	-0.7254	174.6	-	-
72	33	1148 Apr 06	00:59:23	895 -10535	N	-t	1.4511	0.2293	-0.8381	144.5	-	-
73	34	1166 Apr 17	07:53:54	834 -10312	Ne	-t	1.5180	0.1061	-0.9604	99.5	-	-

SAROS SERIES

80

Saros series 80 contains 74 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-38	-0103 Feb 07	07:27:02	11615 -26010	N	a-	1.5540	0.0019	-0.9889	12.0	-	-		
02	-37	-0085 Feb 18	15:37:22	11419 -25787	N	a-	1.5309	0.0440	-0.9465	58.1	-	-		
03	-36	-0067 Feb 28	23:39:55	11226 -25564	N	a-	1.5025	0.0960	-0.8942	85.7	-	-		
04	-35	-0049 Mar 12	07:31:05	11035 -25341	N	a-	1.4658	0.1633	-0.8268	111.4	-	-		
05	-34	-0031 Mar 22	15:14:30	10848 -25118	N	a-	1.4238	0.2404	-0.7498	134.6	-	-		
06	-33	-0013 Apr 02	22:47:39	10663 -24895	N	a-	1.3745	0.3312	-0.6595	157.2	-	-		
07	-32	0005 Apr 13	06:12:33	10481 -24672	N	h-	1.3192	0.4330	-0.5585	178.6	-	-		
08	-31	0023 Apr 24	13:29:16	10301 -24449	N	h-	1.2579	0.5461	-0.4467	199.2	-	-		
09	-30	0041 May 04	20:40:03	10122 -24226	N	h-	1.1924	0.6673	-0.3273	218.4	-	-		
10	-29	0059 May 16	03:45:04	9945 -24003	N	t-	1.1228	0.7960	-0.2008	236.4	-	-		
11	-28	0077 May 26	10:45:32	9770 -23780	N	t-	1.0503	0.9306	-0.0692	253.2	-	-		
12	-27	0095 Jun 06	17:43:22	9596 -23557	P	t-	0.9761	1.0685	0.0653	268.5	58.8	-		
13	-26	0113 Jun 17	00:39:51	9423 -23334	P	t-	0.9012	1.2080	0.2008	282.4	101.5	-		

14	-25	0131 Jun 28 07:35:26	9251 -23111	P t-	0.8262	1.3478	0.3361	295.0	129.2	-
15	-24	0149 Jul 08 14:32:46	9080 -22888	P t-	0.7533	1.4842	0.4674	306.2	149.9	-
16	-23	0167 Jul 19 21:32:33	8909 -22665	P t-	0.6832	1.6156	0.5934	316.0	166.1	-
17	-22	0185 Jul 30 04:37:03	8738 -22442	P t-	0.6174	1.7392	0.7111	324.5	178.9	-
18	-21	0203 Aug 10 11:45:01	8567 -22219	P t-	0.5553	1.8562	0.8221	331.9	189.3	-
19	-20	0221 Aug 20 19:00:25	8396 -21996	P t-	0.5000	1.9609	0.9204	338.2	197.4	-
20	-19	0239 Sep 01 02:21:20	8224 -21773	T t-	0.4501	2.0557	1.0088	343.6	203.9	15.1
21	-18	0257 Sep 11 09:50:39	8052 -21550	T p-	0.4077	2.1367	1.0834	348.0	208.9	45.4
22	-17	0275 Sep 22 17:25:49	7879 -21327	T p-	0.3710	2.2073	1.1478	351.9	212.8	59.2
23	-16	0293 Oct 03 01:10:04	7706 -21104	T p-	0.3421	2.2632	1.1977	355.1	215.7	67.5
24	-15	0311 Oct 14 09:00:15	7532 -20881	T p-	0.3188	2.3088	1.2376	357.8	218.0	73.0
25	-14	0329 Oct 24 16:57:19	7357 -20658	T p-	0.3020	2.3423	1.2660	360.1	219.6	76.6
26	-13	0347 Nov 05 00:59:39	7181 -20435	T p-	0.2899	2.3668	1.2859	362.0	220.8	78.9
27	-12	0365 Nov 15 09:06:45	7004 -20212	T p-	0.2825	2.3823	1.2976	363.6	221.7	80.3
28	-11	0383 Nov 26 17:15:55	6827 -19989	T p-	0.2770	2.3940	1.3060	364.9	222.5	81.3
29	-10	0401 Dec 07 01:25:34	6649 -19766	T p-	0.2725	2.4035	1.3132	366.1	223.1	82.1
30	-09	0419 Dec 18 09:34:45	6471 -19543	T+ p-	0.2681	2.4124	1.3204	367.2	223.8	82.9
31	-08	0437 Dec 28 17:41:27	6292 -19320	T+ p-	0.2627	2.4228	1.3299	368.1	224.5	84.0
32	-07	0456 Jan 09 01:42:52	6114 -19097	T+ pp	0.2531	2.4403	1.3474	369.1	225.5	85.7
33	-06	0474 Jan 19 09:38:27	5936 -18874	T+ pp	0.2394	2.4653	1.3728	370.2	226.7	88.1
34	-05	0492 Jan 30 17:26:12	5760 -18651	T+ pp	0.2197	2.5008	1.4095	371.3	228.2	91.1
35	-04	0510 Feb 10 01:06:17	5583 -18428	T+ pp	0.1942	2.5468	1.4571	372.4	229.8	94.5
36	-03	0528 Feb 21 08:35:33	5406 -18205	T+ pp	0.1605	2.6077	1.5199	373.5	231.6	98.2
37	-02	0546 Mar 03 15:56:24	5231 -17982	T+ pp	0.1203	2.6804	1.5949	374.5	233.3	101.7
38	-01	0564 Mar 13 23:06:18	5057 -17759	T+ pp	0.0713	2.7691	1.6860	375.3	234.8	104.5
39	00	0582 Mar 25 06:07:37	4884 -17536	T+ pp	0.0155	2.8702	1.7896	375.6	235.6	106.0
40	01	0600 Apr 04 12:58:45	4713 -17313	T- pp	-0.0484	2.8085	1.7303	375.4	235.6	105.6
41	02	0618 Apr 15 19:42:39	4543 -17090	T- pp	-0.1182	2.6793	1.6035	374.4	234.3	102.6

42	03	0636	Apr 26	02:19:09	4374	-16867	T-	pp	-0.1939	2.5393	1.4656	372.5	231.6	96.0
43	04	0654	May 07	08:49:12	4207	-16644	T	pp	-0.2749	2.3897	1.3179	369.4	227.0	84.2
44	05	0672	May 17	15:15:17	4042	-16421	T	-t	-0.3592	2.2344	1.1641	365.0	220.3	63.9
45	06	0690	May 28	21:38:06	3879	-16198	T	-t	-0.4462	2.0740	1.0050	359.3	211.1	11.7
46	07	0708	Jun 08	04:00:34	3718	-15975	P	-t	-0.5335	1.9135	0.8453	352.3	199.3	-
47	08	0726	Jun 19	10:21:50	3559	-15752	P	-t	-0.6216	1.7515	0.6839	343.7	184.2	-
48	09	0744	Jun 29	16:46:15	3402	-15529	P	-t	-0.7073	1.5942	0.5266	334.0	165.7	-
49	10	0762	Jul 10	23:13:12	3248	-15306	P	-t	-0.7911	1.4406	0.3728	322.9	142.7	-
50	11	0780	Jul 21	05:45:40	3098	-15083	P	-t	-0.8704	1.2954	0.2270	311.0	113.6	-
51	12	0798	Aug 01	12:23:42	2950	-14860	P	-t	-0.9452	1.1585	0.0892	298.2	72.6	-
52	13	0816	Aug 11	19:10:41	2805	-14637	Nx	-t	-1.0130	1.0346	-0.0357	285.2	-	-
53	14	0834	Aug 23	02:06:02	2665	-14414	N	-t	-1.0744	0.9226	-0.1491	272.1	-	-
54	15	0852	Sep 02	09:10:46	2527	-14191	N	-t	-1.1287	0.8236	-0.2493	259.3	-	-
55	16	0870	Sep 13	16:25:26	2394	-13968	N	-t	-1.1754	0.7387	-0.3356	247.3	-	-
56	17	0888	Sep 23	23:50:47	2265	-13745	N	-t	-1.2137	0.6689	-0.4066	236.5	-	-
57	18	0906	Oct 05	07:26:04	2139	-13522	N	-t	-1.2449	0.6123	-0.4642	227.1	-	-
58	19	0924	Oct 15	15:10:51	2019	-13299	N	-t	-1.2689	0.5686	-0.5086	219.3	-	-
59	20	0942	Oct 26	23:04:38	1902	-13076	N	-t	-1.2864	0.5366	-0.5409	213.2	-	-
60	21	0960	Nov 06	07:06:47	1790	-12853	N	-t	-1.2978	0.5156	-0.5617	209.0	-	-
61	22	0978	Nov 17	15:14:24	1682	-12630	N	-t	-1.3051	0.5017	-0.5748	205.9	-	-
62	23	0996	Nov 27	23:27:59	1580	-12407	N	-t	-1.3084	0.4950	-0.5800	204.0	-	-
63	24	1014	Dec 09	07:43:47	1481	-12184	N	-t	-1.3102	0.4906	-0.5822	202.6	-	-
64	25	1032	Dec 19	16:02:06	1388	-11961	N	-t	-1.3107	0.4883	-0.5817	201.5	-	-
65	26	1050	Dec 31	00:18:08	1299	-11738	N	-t	-1.3134	0.4814	-0.5849	199.5	-	-
66	27	1069	Jan 10	08:34:17	1214	-11515	N	-t	-1.3166	0.4734	-0.5888	197.3	-	-
67	28	1087	Jan 21	16:45:37	1134	-11292	N	-t	-1.3237	0.4579	-0.5995	193.5	-	-
68	29	1105	Feb 01	00:52:56	1059	-11069	N	-t	-1.3351	0.4344	-0.6175	188.2	-	-
69	30	1123	Feb 12	08:53:07	987	-10846	N	-t	-1.3525	0.3994	-0.6467	180.2	-	-

70	31	1141	Feb 22	16:48:14	920	-10623	N	-t	-1.3748	0.3554	-0.6845	170.0	-	-
71	32	1159	Mar 06	00:35:43	857	-10400	N	-t	-1.4037	0.2992	-0.7344	156.0	-	-
72	33	1177	Mar 16	08:16:15	798	-10177	N	-t	-1.4388	0.2316	-0.7955	137.5	-	-
73	34	1195	Mar 27	15:49:48	743	-9954	N	-t	-1.4800	0.1526	-0.8681	111.9	-	-
74	35	1213	Apr 06	23:17:18	691	-9731	Ne	-t	-1.5270	0.0632	-0.9512	72.2	-	-

SAROS SERIES

81

Saros series 81 contains 74 lunar eclipses.

													PHASE	
													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-35	-0020 Feb 19	20:49:27	10736 -24983	Nb	t-	-1.5749	0.0141	-1.0771	37.1	-	-		
02	-34	-0002 Mar 02	04:02:22	10553 -24760	N	t-	-1.5311	0.0925	-0.9948	94.4	-	-		
03	-33	0016 Mar 12	11:08:18	10372 -24537	N	t-	-1.4812	0.1821	-0.9012	131.2	-	-		
04	-32	0034 Mar 23	18:02:46	10192 -24314	N	t-	-1.4215	0.2895	-0.7897	163.6	-	-		

05	-31	0052	Apr 03	00:51:56	10015	-24091	N	t-	-1.3568	0.4062	-0.6690	191.4	-	-
06	-30	0070	Apr 14	07:31:58	9839	-23868	N	t-	-1.2844	0.5372	-0.5341	216.9	-	-
07	-29	0088	Apr 24	14:07:46	9665	-23645	N	t-	-1.2075	0.6765	-0.3912	239.7	-	-
08	-28	0106	May 05	20:37:37	9492	-23422	N	t-	-1.1249	0.8263	-0.2381	260.3	-	-
09	-27	0124	May 16	03:06:14	9319	-23199	N	t-	-1.0404	0.9798	-0.0816	278.4	-	-
10	-26	0142	May 27	09:32:47	9147	-22976	P	t-	-0.9533	1.1384	0.0797	294.3	68.4	-
11	-25	0160	Jun 06	15:59:27	8976	-22753	P	t-	-0.8651	1.2990	0.2425	308.1	116.4	-
12	-24	0178	Jun 17	22:27:50	8805	-22530	P	t-	-0.7776	1.4587	0.4040	319.8	146.3	-
13	-23	0196	Jun 28	05:00:01	8634	-22307	P	t-	-0.6924	1.6143	0.5610	329.4	167.8	-
14	-22	0214	Jul 09	11:36:52	8463	-22084	P	t-	-0.6100	1.7651	0.7128	337.2	184.0	-
15	-21	0232	Jul 19	18:19:51	8292	-21861	P	t-	-0.5317	1.9084	0.8567	343.3	196.2	-
16	-20	0250	Jul 31	01:10:55	8120	-21638	P	t-	-0.4591	2.0414	0.9900	348.0	205.3	-
17	-19	0268	Aug 10	08:10:56	7948	-21415	T	t-	-0.3933	2.1622	1.1108	351.3	212.0	52.2
18	-18	0286	Aug 21	15:19:30	7774	-21192	T	t-	-0.3336	2.2718	1.2203	353.6	216.7	70.8
19	-17	0304	Aug 31	22:38:34	7601	-20969	T	p-	-0.2817	2.3673	1.3155	355.0	220.0	81.6
20	-16	0322	Sep 12	06:08:06	7426	-20746	T	p-	-0.2373	2.4489	1.3967	355.7	222.0	88.5
21	-15	0340	Sep 22	13:48:44	7250	-20523	T	p-	-0.2015	2.5147	1.4623	355.9	223.2	92.7
22	-14	0358	Oct 03	21:38:14	7074	-20300	T	p-	-0.1720	2.5689	1.5164	355.6	223.9	95.5
23	-13	0376	Oct 14	05:38:29	6897	-20077	T	p-	-0.1505	2.6081	1.5559	355.1	224.0	97.1
24	-12	0394	Oct 25	13:47:02	6719	-19854	T	p-	-0.1349	2.6365	1.5848	354.3	223.9	98.0
25	-11	0412	Nov 04	22:03:21	6541	-19631	T	p-	-0.1249	2.6543	1.6037	353.3	223.6	98.4
26	-10	0430	Nov 16	06:24:52	6363	-19408	T	p-	-0.1184	2.6655	1.6164	352.2	223.1	98.6
27	-09	0448	Nov 26	14:51:16	6184	-19185	T	p-	-0.1150	2.6705	1.6237	351.0	222.6	98.7
28	-08	0466	Dec 07	23:20:07	6006	-18962	T	p-	-0.1130	2.6729	1.6288	349.7	222.1	98.6
29	-07	0484	Dec 18	07:49:08	5829	-18739	T	p-	-0.1102	2.6762	1.6356	348.3	221.6	98.7
30	-06	0502	Dec 29	16:17:46	5653	-18516	T	p-	-0.1063	2.6813	1.6447	347.0	221.2	98.8
31	-05	0521	Jan 09	00:43:42	5476	-18293	T	p-	-0.0994	2.6917	1.6598	345.5	220.9	99.1
32	-04	0539	Jan 20	09:05:32	5300	-18070	T	p-	-0.0884	2.7093	1.6825	344.1	220.6	99.5

33	-03	0557	Jan 30	17:21:29	5126	-17847	T-	pp	-0.0718	2.7370	1.7158	342.7	220.4	100.1
34	-02	0575	Feb 11	01:32:10	4952	-17624	T-	pp	-0.0499	2.7742	1.7589	341.2	220.2	100.7
35	-01	0593	Feb 21	09:36:13	4781	-17401	T-	pp	-0.0214	2.8233	1.8141	339.7	219.9	101.2
36	00	0611	Mar 04	17:32:31	4610	-17178	T+	pp	0.0143	2.8331	1.8302	338.1	219.5	101.2
37	01	0629	Mar 15	01:22:20	4441	-16955	T+	pp	0.0562	2.7533	1.7565	336.2	218.7	100.5
38	02	0647	Mar 26	09:05:04	4273	-16732	T+	pp	0.1048	2.6610	1.6703	334.0	217.4	98.7
39	03	0665	Apr 05	16:42:03	4107	-16509	T+	pp	0.1591	2.5585	1.5736	331.4	215.4	95.3
40	04	0683	Apr 17	00:12:10	3943	-16286	T+	-p	0.2200	2.4439	1.4645	328.3	212.5	89.5
41	05	0701	Apr 27	07:38:50	3781	-16063	T	-p	0.2846	2.3227	1.3485	324.6	208.5	80.9
42	06	0719	May 08	15:01:04	3621	-15840	T	-p	0.3534	2.1942	1.2245	320.1	203.3	67.6
43	07	0737	May 18	22:20:50	3464	-15617	T	-a	0.4250	2.0609	1.0952	314.9	196.6	45.8
44	08	0755	May 30	05:39:02	3309	-15394	P	-a	0.4985	1.9242	0.9620	308.9	188.4	-
45	09	0773	Jun 09	12:57:21	3157	-15171	P	-a	0.5723	1.7873	0.8280	302.1	178.5	-
46	10	0791	Jun 20	20:17:03	3008	-14948	P	-a	0.6455	1.6520	0.6948	294.5	166.7	-
47	11	0809	Jul 01	03:37:57	2862	-14725	P	-a	0.7181	1.5179	0.5623	286.2	152.9	-
48	12	0827	Jul 12	11:03:38	2720	-14502	P	-a	0.7871	1.3909	0.4362	277.5	137.0	-
49	13	0845	Jul 22	18:33:10	2581	-14279	P	-a	0.8531	1.2696	0.3152	268.3	118.3	-
50	14	0863	Aug 03	02:09:34	2446	-14056	P	-a	0.9140	1.1579	0.2033	259.0	96.4	-
51	15	0881	Aug 13	09:51:22	2315	-13833	P	-a	0.9707	1.0542	0.0988	249.5	68.0	-
52	16	0899	Aug 24	17:42:20	2188	-13610	P	-a	1.0204	0.9636	0.0071	240.6	18.5	-
53	17	0917	Sep 04	01:40:03	2066	-13387	N	-a	1.0648	0.8829	-0.0751	232.0	-	-
54	18	0935	Sep 15	09:46:31	1947	-13164	N	-a	1.1025	0.8147	-0.1450	224.3	-	-
55	19	0953	Sep 25	18:00:31	1834	-12941	N	-a	1.1343	0.7571	-0.2045	217.3	-	-
56	20	0971	Oct 07	02:23:49	1724	-12718	N	-a	1.1592	0.7124	-0.2511	211.7	-	-
57	21	0989	Oct 17	10:53:56	1620	-12495	N	-a	1.1786	0.6779	-0.2876	207.1	-	-
58	22	1007	Oct 28	19:31:01	1520	-12272	N	-a	1.1928	0.6527	-0.3145	203.7	-	-
59	23	1025	Nov 08	04:13:54	1424	-12049	N	-a	1.2025	0.6356	-0.3331	201.3	-	-
60	24	1043	Nov 19	13:02:16	1333	-11826	N	-a	1.2084	0.6255	-0.3444	199.9	-	-

61	25	1061	Nov 29	21:52:57	1247 -11603	N	-a	1.2125	0.6183	-0.3523	198.9	-	-
62	26	1079	Dec 11	06:46:01	1165 -11380	N	-a	1.2149	0.6140	-0.3570	198.3	-	-
63	27	1097	Dec 21	15:38:35	1088 -11157	N	-a	1.2181	0.6081	-0.3629	197.5	-	-
64	28	1116	Jan 02	00:31:03	1015 -10934	N	-a	1.2216	0.6015	-0.3690	196.6	-	-
65	29	1134	Jan 12	09:18:53	946 -10711	N	-a	1.2292	0.5871	-0.3826	194.6	-	-
66	30	1152	Jan 23	18:04:09	882 -10488	N	-a	1.2392	0.5682	-0.4002	191.8	-	-
67	31	1170	Feb 03	02:42:29	821 -10265	N	-a	1.2550	0.5384	-0.4285	187.3	-	-
68	32	1188	Feb 14	11:15:29	764 -10042	N	-a	1.2752	0.5006	-0.4647	181.4	-	-
69	33	1206	Feb 24	19:39:20	711 -9819	N	-a	1.3030	0.4487	-0.5149	172.7	-	-
70	34	1224	Mar 07	03:57:05	662 -9596	N	-a	1.3356	0.3878	-0.5739	161.6	-	-
71	35	1242	Mar 18	12:05:32	615 -9373	N	-a	1.3760	0.3129	-0.6473	146.4	-	-
72	36	1260	Mar 28	20:06:05	572 -9150	N	-a	1.4225	0.2270	-0.7318	125.8	-	-
73	37	1278	Apr 09	03:58:00	532 -8927	N	-a	1.4755	0.1292	-0.8286	95.9	-	-
74	38	1296	Apr 19	11:43:02	494 -8704	Ne	-a	1.5337	0.0221	-0.9349	40.1	-	-

SAROS SERIES

82

Saros series 82 contains 84 lunar eclipses.

													PHASE	
													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-48	-0208 Sep 21	06:02:33	12820 -27301	N	a-	1.5431	0.0391	-0.9860	57.0	-	-		
02	-47	-0190 Oct 02	14:08:32	12603 -27078	N	a-	1.5148	0.0909	-0.9340	86.2	-	-		
03	-46	-0172 Oct 12	22:23:19	12389 -26855	N	a-	1.4930	0.1306	-0.8937	102.6	-	-		
04	-45	-0154 Oct 24	06:46:34	12180 -26632	N	a-	1.4769	0.1597	-0.8638	112.8	-	-		
05	-44	-0136 Nov 03	15:15:12	11974 -26409	N	a-	1.4645	0.1819	-0.8404	119.7	-	-		
06	-43	-0118 Nov 14	23:50:14	11772 -26186	N	a-	1.4566	0.1955	-0.8250	123.6	-	-		
07	-42	-0100 Nov 25	08:28:03	11573 -25963	N	a-	1.4505	0.2056	-0.8126	126.2	-	-		
08	-41	-0082 Dec 06	17:08:06	11378 -25740	N	a-	1.4457	0.2129	-0.8025	127.9	-	-		
09	-40	-0064 Dec 17	01:47:22	11185 -25517	N	a-	1.4400	0.2216	-0.7904	129.9	-	-		
10	-39	-0046 Dec 28	10:25:45	10996 -25294	N	a-	1.4331	0.2322	-0.7757	132.4	-	-		
11	-38	-0027 Jan 07	19:00:02	10809 -25071	N	a-	1.4227	0.2492	-0.7543	136.4	-	-		
12	-37	-0009 Jan 19	03:29:54	10625 -24848	N	a-	1.4082	0.2732	-0.7254	142.0	-	-		
13	-36	0009 Jan 29	11:53:50	10443 -24625	N	a-	1.3887	0.3065	-0.6869	149.4	-	-		
14	-35	0027 Feb 09	20:12:05	10263 -24402	N	a-	1.3644	0.3484	-0.6397	158.1	-	-		
15	-34	0045 Feb 20	04:21:53	10085 -24179	N	a-	1.3326	0.4040	-0.5786	168.7	-	-		
16	-33	0063 Mar 03	12:25:21	9908 -23956	N	a-	1.2950	0.4701	-0.5070	180.2	-	-		
17	-32	0081 Mar 13	20:20:42	9734 -23733	N	a-	1.2503	0.5494	-0.4223	192.7	-	-		
18	-31	0099 Mar 25	04:10:45	9560 -23510	N	a-	1.2008	0.6377	-0.3289	205.1	-	-		
19	-30	0117 Apr 04	11:52:04	9387 -23287	N	a-	1.1435	0.7404	-0.2213	218.0	-	-		
20	-29	0135 Apr 15	19:30:01	9215 -23064	N	a-	1.0829	0.8494	-0.1079	230.2	-	-		
21	-28	0153 Apr 26	03:01:22	9044 -22841	P	a-	1.0158	0.9705	0.0170	242.3	28.7	-		
22	-27	0171 May 07	10:30:52	8873 -22618	P	a-	0.9470	1.0952	0.1451	253.3	82.1	-		
23	-26	0189 May 17	17:55:32	8702 -22395	P	a-	0.8735	1.2287	0.2813	263.7	111.9	-		

24	-25	0207 May 29 01:20:47	8531 -22172	P a-	0.8000	1.3624	0.4171	272.9	133.4	-
25	-24	0225 Jun 08 08:44:11	8359 -21949	P a-	0.7244	1.5004	0.5564	281.3	150.6	-
26	-23	0243 Jun 19 16:09:20	8188 -21726	P a-	0.6500	1.6366	0.6934	288.6	164.4	-
27	-22	0261 Jun 29 23:35:54	8016 -21503	P a-	0.5764	1.7717	0.8285	294.8	175.5	-
28	-21	0279 Jul 11 07:06:47	7843 -21280	P a-	0.5060	1.9010	0.9573	300.1	184.3	-
29	-20	0297 Jul 21 14:41:54	7669 -21057	T a-	0.4391	2.0245	1.0796	304.4	191.3	41.2
30	-19	0315 Aug 01 22:22:27	7495 -20834	T p-	0.3765	2.1402	1.1936	308.0	196.7	62.0
31	-18	0333 Aug 12 06:09:39	7320 -20611	T p-	0.3193	2.2463	1.2974	310.8	200.8	74.2
32	-17	0351 Aug 23 14:03:56	7144 -20388	T+ p-	0.2677	2.3422	1.3908	313.0	203.8	82.2
33	-16	0369 Sep 02 22:05:42	6967 -20165	T+ p-	0.2226	2.4265	1.4722	314.8	206.0	87.6
34	-15	0387 Sep 14 06:15:23	6789 -19942	T+ p-	0.1840	2.4989	1.5415	316.2	207.5	91.1
35	-14	0405 Sep 24 14:33:21	6611 -19719	T+ p-	0.1523	2.5586	1.5979	317.3	208.6	93.5
36	-13	0423 Oct 05 22:59:03	6433 -19496	T+ p-	0.1272	2.6064	1.6425	318.2	209.3	94.9
37	-12	0441 Oct 16 07:31:19	6255 -19273	T+ p-	0.1076	2.6439	1.6768	319.0	209.8	95.9
38	-11	0459 Oct 27 16:10:32	6076 -19050	T+ p-	0.0941	2.6702	1.7002	319.7	210.1	96.4
39	-10	0477 Nov 07 00:54:50	5899 -18827	T+ p-	0.0854	2.6876	1.7149	320.3	210.4	96.7
40	-09	0495 Nov 18 09:43:17	5723 -18604	T+ p-	0.0800	2.6985	1.7236	320.9	210.6	96.9
41	-08	0513 Nov 28 18:33:24	5546 -18381	T+ p-	0.0764	2.7060	1.7292	321.5	210.8	97.0
42	-07	0531 Dec 10 03:25:05	5369 -18158	T+ p-	0.0746	2.7102	1.7319	322.0	211.1	97.2
43	-06	0549 Dec 20 12:16:10	5194 -17935	T+ pp	0.0726	2.7142	1.7350	322.6	211.4	97.3
44	-05	0567 Dec 31 21:04:38	5021 -17712	T+ pp	0.0689	2.7213	1.7416	323.1	211.7	97.6
45	-04	0586 Jan 11 05:49:30	4848 -17489	T+ pp	0.0626	2.7329	1.7531	323.7	212.1	97.9
46	-03	0604 Jan 22 14:28:53	4677 -17266	T+ pp	0.0520	2.7523	1.7727	324.4	212.7	98.4
47	-02	0622 Feb 01 23:02:22	4507 -17043	T+ pp	0.0369	2.7797	1.8006	325.0	213.2	98.9
48	-01	0640 Feb 13 07:27:28	4339 -16820	T+ pp	0.0153	2.8190	1.8405	325.7	213.8	99.3
49	00	0658 Feb 23 15:45:20	4172 -16597	T- pp	-0.0118	2.8251	1.8473	326.4	214.3	99.6
50	01	0676 Mar 05 23:54:07	4008 -16374	T- pp	-0.0460	2.7620	1.7849	327.0	214.6	99.4
51	02	0694 Mar 17 07:54:00	3845 -16151	T- -p	-0.0871	2.6863	1.7097	327.3	214.6	98.5

52	03	0712 Mar 27	15:44:25	3684 -15928	T-	-p	-0.1357	2.5969	1.6206	327.4	214.0	96.3
53	04	0730 Apr 07	23:26:39	3525 -15705	T-	-p	-0.1904	2.4966	1.5203	327.1	212.7	92.3
54	05	0748 Apr 18	07:01:00	3370 -15482	T-	-p	-0.2510	2.3857	1.4090	326.2	210.5	85.7
55	06	0766 Apr 29	14:26:51	3216 -15259	T	-a	-0.3178	2.2635	1.2860	324.7	206.9	75.1
56	07	0784 May 09	21:47:09	3066 -15036	T	-a	-0.3885	2.1345	1.1555	322.3	201.9	58.0
57	08	0802 May 21	05:01:30	2919 -14813	T	-a	-0.4636	1.9978	1.0168	318.9	195.0	19.9
58	09	0820 May 31	12:12:24	2775 -14590	P	-a	-0.5405	1.8579	0.8745	314.5	186.1	-
59	10	0838 Jun 11	19:19:00	2635 -14367	P	-a	-0.6199	1.7137	0.7270	309.0	174.6	-
60	11	0856 Jun 22	02:25:03	2499 -14144	P	-a	-0.6989	1.5706	0.5803	302.3	160.3	-
61	12	0874 Jul 03	09:30:34	2366 -13921	P	-a	-0.7776	1.4285	0.4338	294.6	142.3	-
62	13	0892 Jul 13	16:36:46	2238 -13698	P	-a	-0.8546	1.2894	0.2900	285.7	119.2	-
63	14	0910 Jul 24	23:45:48	2114 -13475	P	-a	-0.9284	1.1568	0.1520	275.9	88.4	-
64	15	0928 Aug 04	06:58:24	1994 -13252	P	-a	-0.9982	1.0315	0.0212	265.4	33.7	-
65	16	0946 Aug 15	14:16:45	1878 -13029	N	-a	-1.0624	0.9168	-0.0996	254.4	-	-
66	17	0964 Aug 25	21:39:04	1767 -12806	N	-a	-1.1223	0.8101	-0.2126	243.0	-	-
67	18	0982 Sep 06	05:09:09	1660 -12583	N	-a	-1.1749	0.7168	-0.3124	231.8	-	-
68	19	1000 Sep 16	12:44:57	1558 -12360	N	-a	-1.2220	0.6336	-0.4021	220.8	-	-
69	20	1018 Sep 27	20:29:00	1461 -12137	N	-a	-1.2613	0.5647	-0.4774	210.8	-	-
70	21	1036 Oct 08	04:18:46	1368 -11914	N	-a	-1.2952	0.5058	-0.5425	201.5	-	-
71	22	1054 Oct 19	12:16:56	1280 -11691	N	-a	-1.3213	0.4607	-0.5935	194.0	-	-
72	23	1072 Oct 29	20:20:03	1197 -11468	N	-a	-1.3427	0.4243	-0.6354	187.6	-	-
73	24	1090 Nov 10	04:28:53	1118 -11245	N	-a	-1.3586	0.3976	-0.6670	182.7	-	-
74	25	1108 Nov 20	12:41:08	1043 -11022	N	-a	-1.3711	0.3769	-0.6921	178.9	-	-
75	26	1126 Dec 01	20:57:03	973 -10799	N	-h	-1.3794	0.3635	-0.7093	176.5	-	-
76	27	1144 Dec 12	05:12:49	907 -10576	N	-h	-1.3876	0.3500	-0.7258	174.0	-	-
77	28	1162 Dec 23	13:28:13	845 -10353	N	-h	-1.3954	0.3369	-0.7412	171.4	-	-
78	29	1181 Jan 02	21:40:36	786 -10130	N	-h	-1.4048	0.3204	-0.7593	167.9	-	-
79	30	1199 Jan 14	05:50:03	732 -9907	N	-h	-1.4158	0.3006	-0.7799	163.3	-	-

80	31	1217 Jan 24	13:51:51	681	-9684	N	-t	-1.4322	0.2706	-0.8101	155.7	-	-
81	32	1235 Feb 04	21:47:54	633	-9461	N	-t	-1.4525	0.2333	-0.8472	145.4	-	-
82	33	1253 Feb 15	05:33:59	589	-9238	N	-t	-1.4801	0.1824	-0.8974	129.4	-	-
83	34	1271 Feb 26	13:12:42	547	-9015	N	-t	-1.5127	0.1219	-0.9568	106.5	-	-
84	35	1289 Mar 08	20:39:13	508	-8792	Ne	-t	-1.5540	0.0455	-1.0319	65.6	-	-

SAROS SERIES

83

Saros series 83 contains 84 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST ECLIPSE														
01	-47	-0197 Aug 22	10:35:52	12688	-27166	Nb a-	-1.5282	0.0326	-0.9254	48.5	-	-		
02	-46	-0179 Sep 01	18:37:09	12473	-26943	N a-	-1.4899	0.1051	-0.8574	86.6	-	-		
03	-45	-0161 Sep 13	02:46:53	12262	-26720	N a-	-1.4590	0.1641	-0.8028	107.9	-	-		
04	-44	-0143 Sep 23	11:04:15	12055	-26497	N a-	-1.4344	0.2115	-0.7600	122.2	-	-		

05	-43	-0125	Oct 04	19:28:33	11851	-26274	N	a-	-1.4160	0.2476	-0.7283	132.2	-	-
06	-42	-0107	Oct 15	03:59:52	11651	-26051	N	a-	-1.4036	0.2725	-0.7077	138.7	-	-
07	-41	-0089	Oct 26	12:36:51	11454	-25828	N	a-	-1.3961	0.2882	-0.6960	142.9	-	-
08	-40	-0071	Nov 05	21:18:58	11261	-25605	N	a-	-1.3936	0.2947	-0.6933	144.7	-	-
09	-39	-0053	Nov 17	06:02:57	11070	-25382	N	a-	-1.3931	0.2972	-0.6939	145.7	-	-
10	-38	-0035	Nov 27	14:50:06	10882	-25159	N	a-	-1.3958	0.2936	-0.7002	145.3	-	-
11	-37	-0017	Dec 08	23:36:28	10697	-24936	N	a-	-1.3982	0.2904	-0.7057	144.9	-	-
12	-36	0001	Dec 19	08:21:56	10514	-24713	N	a-	-1.4007	0.2866	-0.7112	144.4	-	-
13	-35	0019	Dec 30	17:02:45	10334	-24490	N	a-	-1.4001	0.2883	-0.7107	145.2	-	-
14	-34	0038	Jan 10	01:39:57	10155	-24267	N	a-	-1.3974	0.2938	-0.7061	146.9	-	-
15	-33	0056	Jan 21	10:10:15	9978	-24044	N	a-	-1.3896	0.3083	-0.6920	150.7	-	-
16	-32	0074	Jan 31	18:33:21	9802	-23821	N	a-	-1.3768	0.3319	-0.6686	156.5	-	-
17	-31	0092	Feb 12	02:47:35	9628	-23598	N	a-	-1.3574	0.3675	-0.6331	164.6	-	-
18	-30	0110	Feb 22	10:53:24	9455	-23375	N	a-	-1.3321	0.4139	-0.5866	174.4	-	-
19	-29	0128	Mar 04	18:48:56	9283	-23152	N	a-	-1.2993	0.4741	-0.5263	186.2	-	-
20	-28	0146	Mar 16	02:35:11	9111	-22929	N	a-	-1.2595	0.5471	-0.4534	199.3	-	-
21	-27	0164	Mar 26	10:11:32	8940	-22706	N	h-	-1.2126	0.6334	-0.3675	213.3	-	-
22	-26	0182	Apr 06	17:39:41	8769	-22483	N	h-	-1.1597	0.7308	-0.2708	227.7	-	-
23	-25	0200	Apr 17	00:57:37	8598	-22260	N	h-	-1.0994	0.8420	-0.1606	242.6	-	-
24	-24	0218	Apr 28	08:09:17	8427	-22037	N	t-	-1.0348	0.9613	-0.0428	257.0	-	-
25	-23	0236	May 08	15:13:02	8256	-21814	P	t-	-0.9647	1.0907	0.0847	271.1	66.9	-
26	-22	0254	May 19	22:13:01	8084	-21591	P	t-	-0.8921	1.2253	0.2169	284.3	105.4	-
27	-21	0272	May 30	05:06:03	7911	-21368	P	t-	-0.8147	1.3688	0.3574	296.9	132.9	-
28	-20	0290	Jun 10	11:58:47	7738	-21145	P	t-	-0.7378	1.5117	0.4967	308.2	154.0	-
29	-19	0308	Jun 20	18:48:20	7564	-20922	P	t-	-0.6593	1.6577	0.6386	318.5	171.2	-
30	-18	0326	Jul 02	01:39:34	7389	-20699	P	t-	-0.5829	1.8002	0.7766	327.6	185.1	-
31	-17	0344	Jul 12	08:30:50	7213	-20476	P	t-	-0.5072	1.9417	0.9131	335.6	196.6	-
32	-16	0362	Jul 23	15:27:04	7037	-20253	T	t-	-0.4363	2.0746	1.0406	342.4	205.6	32.0

33	-15	0380	Aug 02	22:26:39	6859	-20030	T	p-	-0.3691	2.2008	1.1610	348.2	212.8	61.5
34	-14	0398	Aug 14	05:31:29	6682	-19807	T	p-	-0.3069	2.3178	1.2721	353.1	218.3	77.1
35	-13	0416	Aug 24	12:42:36	6503	-19584	T-	pp	-0.2507	2.4241	1.3722	357.1	222.5	87.0
36	-12	0434	Sep 04	20:01:17	6325	-19361	T-	pp	-0.2015	2.5174	1.4594	360.5	225.5	93.4
37	-11	0452	Sep 15	03:27:27	6147	-19138	T-	pp	-0.1592	2.5982	1.5340	363.3	227.8	97.6
38	-10	0470	Sep 26	11:00:41	5969	-18915	T-	pp	-0.1234	2.6668	1.5967	365.6	229.3	100.3
39	-09	0488	Oct 06	18:42:13	5792	-18692	T-	pp	-0.0953	2.7213	1.6455	367.6	230.4	101.9
40	-08	0506	Oct 18	02:30:34	5616	-18469	T-	pp	-0.0733	2.7643	1.6833	369.3	231.2	102.9
41	-07	0524	Oct 28	10:24:53	5439	-18246	T-	pp	-0.0569	2.7968	1.7112	370.8	231.8	103.5
42	-06	0542	Nov 08	18:24:22	5263	-18023	T-	pp	-0.0452	2.8203	1.7307	372.1	232.3	103.8
43	-05	0560	Nov 19	02:28:07	5089	-17800	T-	pp	-0.0373	2.8366	1.7435	373.2	232.7	104.0
44	-04	0578	Nov 30	10:34:02	4916	-17577	T-	pp	-0.0317	2.8481	1.7524	374.1	233.0	104.1
45	-03	0596	Dec 10	18:39:58	4744	-17354	T-	pp	-0.0264	2.8587	1.7612	375.0	233.4	104.3
46	-02	0614	Dec 22	02:45:31	4574	-17131	T-	pp	-0.0210	2.8690	1.7705	375.6	233.7	104.4
47	-01	0633	Jan 01	10:48:22	4405	-16908	T-	pp	-0.0135	2.8831	1.7843	376.2	234.1	104.6
48	00	0651	Jan 12	18:45:55	4238	-16685	T-	pp	-0.0019	2.9040	1.8058	376.6	234.4	104.8
49	01	0669	Jan 23	02:37:33	4072	-16462	T+	pp	0.0143	2.8808	1.7837	376.9	234.6	105.0
50	02	0687	Feb 03	10:21:39	3909	-16239	T+	pp	0.0365	2.8391	1.7438	376.9	234.8	104.8
51	03	0705	Feb 13	17:58:13	3747	-16016	T+	pp	0.0649	2.7859	1.6928	376.8	234.7	104.2
52	04	0723	Feb 25	01:24:07	3588	-15793	T+	pp	0.1017	2.7170	1.6265	376.2	234.2	102.8
53	05	0741	Mar 07	08:41:47	3431	-15570	T+	pp	0.1452	2.6359	1.5481	375.3	233.1	100.0
54	06	0759	Mar 18	15:48:35	3277	-15347	T+	pp	0.1971	2.5391	1.4544	373.7	231.1	95.0
55	07	0777	Mar 28	22:47:16	3125	-15124	T+	pp	0.2556	2.4301	1.3485	371.4	228.0	86.9
56	08	0795	Apr 09	05:35:52	2977	-14901	T	-t	0.3224	2.3061	1.2275	368.1	223.2	73.5
57	09	0813	Apr 19	12:18:18	2832	-14678	T	-t	0.3940	2.1731	1.0974	363.7	216.7	50.3
58	10	0831	Apr 30	18:53:15	2690	-14455	P	-t	0.4716	2.0295	0.9565	358.0	207.8	-
59	11	0849	May 11	01:23:11	2552	-14232	P	-t	0.5532	1.8784	0.8079	350.8	196.1	-
60	12	0867	May 22	07:49:10	2418	-14009	P	-t	0.6379	1.7219	0.6535	342.1	180.9	-

61	13	0885	Jun 01	14:13:12	2288	-13786	P	-t	0.7240	1.5630	0.4964	331.8	161.6	-
62	14	0903	Jun 12	20:36:58	2162	-13563	P	-t	0.8107	1.4032	0.3380	319.8	136.5	-
63	15	0921	Jun 23	03:00:54	2040	-13340	P	-t	0.8972	1.2440	0.1798	306.0	101.8	-
64	16	0939	Jul 04	09:28:30	1923	-13117	P	-t	0.9807	1.0905	0.0269	290.9	40.2	-
65	17	0957	Jul 14	15:59:57	1810	-12894	N	-t	1.0609	0.9432	-0.1201	274.3	-	-
66	18	0975	Jul 25	22:37:10	1702	-12671	N	-t	1.1367	0.8042	-0.2591	256.4	-	-
67	19	0993	Aug 05	05:21:17	1598	-12448	N	-t	1.2070	0.6753	-0.3885	237.6	-	-
68	20	1011	Aug 16	12:13:51	1499	-12225	N	-t	1.2709	0.5584	-0.5060	218.1	-	-
69	21	1029	Aug 26	19:15:46	1405	-12002	N	-t	1.3273	0.4553	-0.6099	198.4	-	-
70	22	1047	Sep 07	02:25:55	1315	-11779	N	-t	1.3774	0.3638	-0.7022	178.5	-	-
71	23	1065	Sep 17	09:47:23	1229	-11556	N	-t	1.4189	0.2881	-0.7788	159.7	-	-
72	24	1083	Sep 28	17:18:17	1148	-11333	N	-t	1.4534	0.2252	-0.8424	141.6	-	-
73	25	1101	Oct 09	01:00:25	1072	-11110	N	-t	1.4795	0.1776	-0.8906	126.0	-	-
74	26	1119	Oct 20	08:50:17	1000	-10887	N	-t	1.5000	0.1401	-0.9283	112.0	-	-
75	27	1137	Oct 30	16:50:45	932	-10664	N	-t	1.5128	0.1164	-0.9519	102.1	-	-
76	28	1155	Nov 11	00:57:26	869	-10441	N	-t	1.5216	0.1001	-0.9675	94.5	-	-
77	29	1173	Nov 21	09:11:11	809	-10218	N	-t	1.5255	0.0922	-0.9741	90.5	-	-
78	30	1191	Dec 02	17:28:32	753	-9995	N	-t	1.5273	0.0880	-0.9766	88.2	-	-
79	31	1209	Dec 13	01:50:03	701	-9772	N	-t	1.5268	0.0877	-0.9744	87.7	-	-
80	32	1227	Dec 24	10:11:43	652	-9549	N	-h	1.5267	0.0862	-0.9727	86.7	-	-
81	33	1246	Jan 03	18:33:05	606	-9326	N	-h	1.5278	0.0823	-0.9727	84.4	-	-
82	34	1264	Jan 15	02:52:06	563	-9103	N	-h	1.5314	0.0734	-0.9771	79.5	-	-
83	35	1282	Jan 25	11:08:16	523	-8880	N	-h	1.5382	0.0585	-0.9870	70.8	-	-
84	36	1300	Feb 05	19:17:56	486	-8657	N	-h	1.5506	0.0329	-1.0070	53.0	-	-

SAROS SERIES

84

Saros series 84 contains 84 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-34	-0096 Sep 13	16:42:16	11532	-25916	Nb t-	1.5681	0.0231	-1.0613	47.2	-	-		
02	-33	-0078 Sep 25	00:09:28	11337	-25693	N t-	1.5356	0.0852	-1.0041	90.3	-	-		
03	-32	-0060 Oct 05	07:45:02	11145	-25470	N t-	1.5099	0.1346	-0.9592	113.2	-	-		
04	-31	-0042 Oct 16	15:27:47	10956	-25247	N t-	1.4899	0.1734	-0.9243	128.3	-	-		
05	-30	-0024 Oct 26	23:17:15	10770	-25024	N t-	1.4753	0.2019	-0.8992	138.4	-	-		
06	-29	-0006 Nov 07	07:11:56	10586	-24801	N t-	1.4648	0.2225	-0.8812	145.2	-	-		
07	-28	0012 Nov 17	15:11:20	10405	-24578	N t-	1.4580	0.2359	-0.8697	149.5	-	-		
08	-27	0030 Nov 28	23:11:31	10225	-24355	N t-	1.4521	0.2472	-0.8594	153.0	-	-		
09	-26	0048 Dec 09	07:13:58	10048	-24132	N t-	1.4478	0.2553	-0.8516	155.4	-	-		
10	-25	0066 Dec 20	15:13:55	9871	-23909	N t-	1.4417	0.2660	-0.8402	158.5	-	-		
11	-24	0084 Dec 30	23:12:01	9697	-23686	N t-	1.4338	0.2799	-0.8249	162.3	-	-		
12	-23	0103 Jan 11	07:03:37	9523	-23463	N t-	1.4206	0.3031	-0.7996	168.4	-	-		
13	-22	0121 Jan 21	14:51:16	9351	-23240	N t-	1.4040	0.3321	-0.7678	175.7	-	-		

14	-21	0139 Feb 01	22:30:28	9179 -23017	N t-	1.3808	0.3729	-0.7236	185.2	-	-
15	-20	0157 Feb 12	06:02:07	9008 -22794	N t-	1.3510	0.4256	-0.6670	196.6	-	-
16	-19	0175 Feb 23	13:24:09	8837 -22571	N t-	1.3133	0.4927	-0.5957	209.8	-	-
17	-18	0193 Mar 05	20:38:25	8666 -22348	N t-	1.2688	0.5721	-0.5118	224.0	-	-
18	-17	0211 Mar 17	03:43:20	8495 -22125	N t-	1.2164	0.6660	-0.4133	238.9	-	-
19	-16	0229 Mar 27	10:40:07	8323 -21902	N t-	1.1570	0.7727	-0.3020	254.0	-	-
20	-15	0247 Apr 07	17:29:14	8152 -21679	N t-	1.0906	0.8921	-0.1780	269.0	-	-
21	-14	0265 Apr 18	00:12:24	7979 -21456	Nx t-	1.0186	1.0221	-0.0437	283.2	-	-
22	-13	0283 Apr 29	06:49:36	7806 -21233	P t-	0.9408	1.1627	0.1011	296.7	76.8	-
23	-12	0301 May 09	13:23:23	7633 -21010	P t-	0.8594	1.3102	0.2524	309.0	118.5	-
24	-11	0319 May 20	19:54:21	7458 -20787	P t-	0.7744	1.4643	0.4100	320.0	147.1	-
25	-10	0337 May 31	02:25:45	7283 -20564	P t-	0.6889	1.6198	0.5685	329.3	168.6	-
26	-09	0355 Jun 11	08:56:17	7106 -20341	P t-	0.6013	1.7792	0.7305	337.4	185.6	-
27	-08	0373 Jun 21	15:31:05	6930 -20118	P t-	0.5162	1.9343	0.8878	343.7	198.5	-
28	-07	0391 Jul 02	22:08:30	6752 -19895	T t-	0.4318	2.0883	1.0435	348.8	208.6	33.5
29	-06	0409 Jul 13	04:53:15	6574 -19672	T t-	0.3525	2.2330	1.1896	352.3	215.8	66.6
30	-05	0427 Jul 24	11:42:43	6395 -19449	T t-	0.2761	2.3729	1.3303	354.8	221.0	83.4
31	-04	0445 Aug 03	18:41:53	6217 -19226	T+ p-	0.2065	2.5002	1.4583	356.1	224.3	93.2
32	-03	0463 Aug 15	01:48:36	6039 -19003	T+ pp	0.1421	2.6183	1.5767	356.7	226.3	99.0
33	-02	0481 Aug 25	09:05:22	5862 -18780	T+ pp	0.0851	2.7227	1.6812	356.5	227.1	102.0
34	-01	0499 Sep 05	16:31:35	5686 -18557	T+ pp	0.0350	2.8146	1.7731	355.8	227.0	103.2
35	00	0517 Sep 16	00:08:53	5508 -18334	T- pp	-0.0065	2.8670	1.8254	354.8	226.5	103.2
36	01	0535 Sep 27	07:56:26	5332 -18111	T- pp	-0.0406	2.8044	1.7627	353.6	225.6	102.5
37	02	0553 Oct 07	15:53:05	5158 -17888	T- pp	-0.0681	2.7538	1.7124	352.3	224.6	101.4
38	03	0571 Oct 18	23:59:27	4984 -17665	T- pp	-0.0884	2.7164	1.6754	351.0	223.5	100.4
39	04	0589 Oct 29	08:13:54	4812 -17442	T- pp	-0.1026	2.6901	1.6498	349.6	222.6	99.4
40	05	0607 Nov 09	16:35:38	4641 -17219	T- pp	-0.1117	2.6726	1.6336	348.3	221.7	98.7
41	06	0625 Nov 20	01:02:11	4472 -16996	T- pp	-0.1175	2.6611	1.6238	347.0	221.0	98.1

42	07	0643	Dec 01	09:33:27	4304	-16773	T-	pp	-0.1204	2.6548	1.6198	345.7	220.3	97.8
43	08	0661	Dec 11	18:06:47	4138	-16550	T-	pp	-0.1221	2.6501	1.6180	344.3	219.7	97.6
44	09	0679	Dec 23	02:40:26	3973	-16327	T-	pp	-0.1243	2.6443	1.6158	342.9	219.1	97.3
45	10	0698	Jan 02	11:12:53	3811	-16104	T-	pp	-0.1281	2.6353	1.6108	341.4	218.5	97.0
46	11	0716	Jan 13	19:42:46	3650	-15881	T-	pp	-0.1345	2.6211	1.6013	339.8	217.9	96.5
47	12	0734	Jan 24	04:07:54	3492	-15658	T-	pp	-0.1456	2.5982	1.5835	338.1	217.1	95.7
48	13	0752	Feb 04	12:27:31	3337	-15435	T-	pp	-0.1619	2.5656	1.5563	336.2	216.1	94.5
49	14	0770	Feb 14	20:40:58	3185	-15212	T-	p	-0.1839	2.5223	1.5188	334.1	214.8	92.6
50	15	0788	Feb 26	04:48:17	3035	-14989	T-	p	-0.2114	2.4689	1.4712	331.8	213.2	89.9
51	16	0806	Mar 08	12:46:53	2889	-14766	T-	p	-0.2470	2.4005	1.4089	329.2	211.0	85.7
52	17	0824	Mar 18	20:39:25	2746	-14543	T	p	-0.2883	2.3219	1.3360	326.1	208.2	79.7
53	18	0842	Mar 30	04:24:21	2606	-14320	T	p	-0.3367	2.2301	1.2500	322.5	204.5	70.7
54	19	0860	Apr 09	12:04:18	2471	-14097	T	p	-0.3899	2.1298	1.1552	318.4	199.9	57.4
55	20	0878	Apr 20	19:36:55	2339	-13874	T	-a	-0.4498	2.0172	1.0476	313.5	193.8	32.8
56	21	0896	May 01	03:06:49	2211	-13651	P	-a	-0.5129	1.8992	0.9342	307.9	186.4	-
57	22	0914	May 12	10:31:56	2088	-13428	P	-a	-0.5808	1.7724	0.8115	301.3	177.0	-
58	23	0932	May 22	17:55:33	1969	-13205	P	-a	-0.6506	1.6426	0.6853	293.9	165.8	-
59	24	0950	Jun 03	01:16:29	1854	-12982	P	-a	-0.7231	1.5081	0.5536	285.4	151.8	-
60	25	0968	Jun 13	08:38:46	1744	-12759	P	-a	-0.7952	1.3748	0.4226	276.1	135.1	-
61	26	0986	Jun 24	16:01:32	1639	-12536	P	-a	-0.8673	1.2416	0.2910	265.8	114.0	-
62	27	1004	Jul 04	23:26:40	1538	-12313	P	-a	-0.9379	1.1116	0.1619	254.6	86.5	-
63	28	1022	Jul 16	06:55:23	1441	-12090	P	-a	-1.0059	0.9866	0.0374	242.8	42.2	-
64	29	1040	Jul 26	14:28:59	1350	-11867	N	-a	-1.0703	0.8686	-0.0809	230.3	-	-
65	30	1058	Aug 06	22:08:18	1262	-11644	N	-a	-1.1301	0.7591	-0.1912	217.5	-	-
66	31	1076	Aug 17	05:53:26	1180	-11421	N	-a	-1.1855	0.6583	-0.2933	204.4	-	-
67	32	1094	Aug 28	13:46:15	1102	-11198	N	-a	-1.2350	0.5683	-0.3850	191.5	-	-
68	33	1112	Sep 07	21:46:49	1028	-10975	N	-a	-1.2786	0.4893	-0.4660	179.0	-	-
69	34	1130	Sep 19	05:54:50	959	-10752	N	-a	-1.3164	0.4211	-0.5364	167.1	-	-

70	35	1148	Sep 29	14:11:31	893	-10529	N	-a	-1.3475	0.3652	-0.5947	156.4	-	-
71	36	1166	Oct 10	22:35:56	832	-10306	N	-a	-1.3726	0.3203	-0.6420	147.1	-	-
72	37	1184	Oct 21	07:08:36	775	-10083	N	-a	-1.3915	0.2868	-0.6778	139.7	-	-
73	38	1202	Nov 01	15:46:21	721	-9860	N	-a	-1.4068	0.2598	-0.7070	133.3	-	-
74	39	1220	Nov 12	00:31:04	671	-9637	N	-a	-1.4166	0.2427	-0.7260	129.1	-	-
75	40	1238	Nov 23	09:19:23	624	-9414	N	-a	-1.4237	0.2306	-0.7396	126.1	-	-
76	41	1256	Dec 03	18:11:29	580	-9191	N	-a	-1.4280	0.2232	-0.7482	124.2	-	-
77	42	1274	Dec 15	03:03:39	539	-8968	N	-a	-1.4323	0.2157	-0.7565	122.3	-	-
78	43	1292	Dec 25	11:56:44	501	-8745	N	-a	-1.4360	0.2090	-0.7635	120.5	-	-
79	44	1311	Jan 05	20:47:32	465	-8522	N	-a	-1.4416	0.1988	-0.7736	117.7	-	-
80	45	1329	Jan 16	05:35:00	431	-8299	N	-a	-1.4497	0.1837	-0.7882	113.4	-	-
81	46	1347	Jan 27	14:17:28	400	-8076	N	-a	-1.4618	0.1611	-0.8100	106.5	-	-
82	47	1365	Feb 06	22:54:26	370	-7853	N	-a	-1.4782	0.1304	-0.8395	96.2	-	-
83	48	1383	Feb 18	07:23:57	342	-7630	N	-a	-1.5005	0.0889	-0.8799	79.8	-	-
84	49	1401	Feb 28	15:45:52	316	-7407	Ne	-a	-1.5288	0.0363	-0.9312	51.3	-	-

SAROS SERIES

85

Saros series 85 contains 76 lunar eclipses.

PHASE													
DURATIONS													
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-37	-0103 Aug 02	10:16:17	11609 -26004	Nb	a-	-1.5379	0.0436	-0.9714	60.3	-	-	
02	-36	-0085 Aug 13	17:40:08	11413 -25781	N	a-	-1.4777	0.1538	-0.8607	111.7	-	-	
03	-35	-0067 Aug 24	01:12:34	11220 -25558	N	a-	-1.4235	0.2531	-0.7611	141.5	-	-	
04	-34	-0049 Sep 04	08:56:23	11030 -25335	N	a-	-1.3774	0.3375	-0.6765	161.6	-	-	
05	-33	-0031 Sep 14	16:49:26	10843 -25112	N	a-	-1.3382	0.4094	-0.6045	176.2	-	-	
06	-32	-0013 Sep 26	00:52:16	10658 -24889	N	a-	-1.3061	0.4683	-0.5455	186.8	-	-	
07	-31	0005 Oct 06	09:04:02	10476 -24666	N	a-	-1.2805	0.5151	-0.4985	194.5	-	-	
08	-30	0023 Oct 17	17:25:13	10296 -24443	N	a-	-1.2617	0.5494	-0.4636	199.6	-	-	
09	-29	0041 Oct 28	01:53:07	10117 -24220	N	a-	-1.2479	0.5743	-0.4380	202.9	-	-	
10	-28	0059 Nov 08	10:27:17	9941 -23997	N	a-	-1.2384	0.5911	-0.4200	204.9	-	-	
11	-27	0077 Nov 18	19:05:53	9766 -23774	N	a-	-1.2320	0.6020	-0.4073	205.9	-	-	
12	-26	0095 Nov 30	03:48:43	9592 -23551	N	a-	-1.2282	0.6079	-0.3992	206.2	-	-	
13	-25	0113 Dec 10	12:31:29	9419 -23328	N	a-	-1.2238	0.6146	-0.3898	206.5	-	-	
14	-24	0131 Dec 21	21:14:54	9247 -23105	N	a-	-1.2194	0.6210	-0.3801	206.8	-	-	
15	-23	0150 Jan 01	05:55:06	9075 -22882	N	a-	-1.2118	0.6331	-0.3643	207.8	-	-	
16	-22	0168 Jan 12	14:33:16	8904 -22659	N	a-	-1.2022	0.6486	-0.3446	209.4	-	-	
17	-21	0186 Jan 22	23:04:27	8733 -22436	N	a-	-1.1863	0.6754	-0.3132	212.4	-	-	
18	-20	0204 Feb 03	07:31:42	8562 -22213	N	a-	-1.1668	0.7087	-0.2750	216.1	-	-	
19	-19	0222 Feb 13	15:50:36	8391 -21990	N	a-	-1.1400	0.7553	-0.2234	221.3	-	-	
20	-18	0240 Feb 25	00:03:13	8219 -21767	N	a-	-1.1079	0.8117	-0.1618	227.4	-	-	
21	-17	0258 Mar 07	08:06:48	8047 -21544	N	a-	-1.0679	0.8826	-0.0860	234.7	-	-	

22	-16	0276	Mar 17	16:04:41	7875	-21321	N	a-	-1.0228	0.9629	-0.0008	242.3	-	-
23	-15	0294	Mar 28	23:54:39	7701	-21098	P	a-	-0.9706	1.0563	0.0972	250.6	67.7	-
24	-14	0312	Apr 08	07:38:25	7527	-20875	P	a-	-0.9128	1.1602	0.2054	258.9	96.7	-
25	-13	0330	Apr 19	15:16:16	7352	-20652	P	a-	-0.8498	1.2739	0.3228	267.2	119.1	-
26	-12	0348	Apr 29	22:50:04	7176	-20429	P	a-	-0.7830	1.3948	0.4470	275.2	137.4	-
27	-11	0366	May 11	06:19:37	6999	-20206	P	a-	-0.7122	1.5234	0.5783	282.7	153.0	-
28	-10	0384	May 21	13:46:34	6822	-19983	P	a-	-0.6387	1.6573	0.7142	289.5	166.2	-
29	-09	0402	Jun 01	21:12:31	6644	-19760	P	a-	-0.5640	1.7936	0.8519	295.6	177.2	-
30	-08	0420	Jun 12	04:38:37	6466	-19537	P	a-	-0.4894	1.9302	0.9892	300.9	186.3	-
31	-07	0438	Jun 23	12:05:03	6287	-19314	T	a-	-0.4149	2.0668	1.1259	305.5	193.7	51.1
32	-06	0456	Jul 03	19:34:25	6109	-19091	T	p-	-0.3426	2.1997	1.2582	309.1	199.5	70.1
33	-05	0474	Jul 15	03:06:47	5932	-18868	T	p-	-0.2731	2.3280	1.3853	312.1	203.9	82.0
34	-04	0492	Jul 25	10:44:18	5755	-18645	T-	p-	-0.2078	2.4487	1.5041	314.4	207.0	89.6
35	-03	0510	Aug 05	18:25:38	5578	-18422	T-	p-	-0.1460	2.5633	1.6163	316.1	209.2	94.5
36	-02	0528	Aug 16	02:14:41	5402	-18199	T-	pp	-0.0909	2.6657	1.7160	317.3	210.5	97.3
37	-01	0546	Aug 27	10:09:38	5226	-17976	T-	pp	-0.0411	2.7588	1.8059	318.2	211.1	98.6
38	00	0564	Sep 06	18:12:55	5053	-17753	T+	pp	0.0017	2.8328	1.8764	318.8	211.3	98.9
39	01	0582	Sep 18	02:23:05	4880	-17530	T+	pp	0.0385	2.7671	1.8070	319.2	211.2	98.5
40	02	0600	Sep 28	10:42:03	4708	-17307	T+	-p	0.0679	2.7152	1.7514	319.6	210.9	97.7
41	03	0618	Oct 09	19:07:54	4538	-17084	T+	-p	0.0911	2.6744	1.7068	320.1	210.6	96.8
42	04	0636	Oct 20	03:40:23	4370	-16861	T+	-p	0.1088	2.6438	1.6727	320.5	210.4	96.0
43	05	0654	Oct 31	12:19:22	4203	-16638	T+	-p	0.1208	2.6234	1.6489	321.0	210.2	95.3
44	06	0672	Nov 10	21:03:25	4038	-16415	T+	-p	0.1288	2.6103	1.6328	321.6	210.2	94.8
45	07	0690	Nov 22	05:51:18	3874	-16192	T+	-p	0.1331	2.6038	1.6236	322.2	210.3	94.6
46	08	0708	Dec 02	14:40:25	3713	-15969	T+	-p	0.1362	2.5991	1.6168	322.9	210.5	94.4
47	09	0726	Dec 13	23:31:01	3554	-15746	T+	-p	0.1377	2.5973	1.6132	323.6	210.7	94.4
48	10	0744	Dec 24	08:20:06	3398	-15523	T+	-p	0.1405	2.5927	1.6074	324.2	211.0	94.3
49	11	0763	Jan 04	17:06:25	3244	-15300	T+	-p	0.1450	2.5848	1.5987	324.8	211.2	94.2

50	12	0781	Jan 15	01:47:56	3094	-15077	T+	-p	0.1533	2.5699	1.5833	325.4	211.4	93.8
51	13	0799	Jan 26	10:24:05	2946	-14854	T+	-p	0.1656	2.5475	1.5608	325.8	211.5	93.0
52	14	0817	Feb 05	18:53:17	2802	-14631	T+	-p	0.1832	2.5150	1.5285	326.1	211.3	91.8
53	15	0835	Feb 17	03:14:18	2661	-14408	T+	-p	0.2072	2.4707	1.4845	326.3	210.8	89.7
54	16	0853	Feb 27	11:26:50	2524	-14185	T+	-p	0.2379	2.4142	1.4284	326.1	209.9	86.5
55	17	0871	Mar 10	19:30:43	2390	-13962	T	-p	0.2753	2.3455	1.3601	325.6	208.4	81.5
56	18	0889	Mar 21	03:24:49	2261	-13739	T	-p	0.3202	2.2630	1.2778	324.7	206.1	73.9
57	19	0907	Apr 01	11:10:21	2136	-13516	T	-a	0.3718	2.1684	1.1831	323.1	202.7	62.1
58	20	0925	Apr 11	18:46:56	2015	-13293	T	-a	0.4300	2.0616	1.0760	320.8	197.9	41.5
59	21	0943	Apr 23	02:16:28	1899	-13070	P	-a	0.4936	1.9454	0.9590	317.6	191.5	-
60	22	0961	May 03	09:36:58	1787	-12847	P	-a	0.5637	1.8173	0.8297	313.3	182.8	-
61	23	0979	May 14	16:52:28	1680	-12624	P	-a	0.6369	1.6838	0.6945	307.8	171.7	-
62	24	0997	May 25	00:01:22	1577	-12401	P	-a	0.7145	1.5426	0.5510	301.0	157.0	-
63	25	1015	Jun 05	07:07:30	1479	-12178	P	-a	0.7935	1.3991	0.4048	292.7	138.1	-
64	26	1033	Jun 15	14:08:41	1385	-11955	P	-a	0.8753	1.2507	0.2530	282.7	112.1	-
65	27	1051	Jun 26	21:10:32	1296	-11732	P	-a	0.9553	1.1059	0.1042	271.3	73.7	-
66	28	1069	Jul 07	04:10:43	1212	-11509	N	-a	1.0352	0.9616	-0.0445	258.1	-	-
67	29	1087	Jul 18	11:13:13	1132	-11286	N	-a	1.1118	0.8234	-0.1877	243.4	-	-
68	30	1105	Jul 28	18:17:13	1057	-11063	N	-h	1.1862	0.6896	-0.3269	226.8	-	-
69	31	1123	Aug 09	01:26:18	985	-10840	N	-h	1.2552	0.5660	-0.4563	209.0	-	-
70	32	1141	Aug 19	08:39:40	919	-10617	N	-h	1.3195	0.4511	-0.5773	189.5	-	-
71	33	1159	Aug 30	15:58:49	856	-10394	N	-h	1.3780	0.3469	-0.6878	168.6	-	-
72	34	1177	Sep 09	23:24:39	797	-10171	N	-h	1.4299	0.2548	-0.7862	146.4	-	-
73	35	1195	Sep 21	06:58:05	742	-9948	N	-h	1.4749	0.1755	-0.8719	122.9	-	-
74	36	1213	Oct 01	14:38:31	690	-9725	N	-h	1.5134	0.1080	-0.9457	97.4	-	-
75	37	1231	Oct 12	22:26:32	642	-9502	N	-h	1.5451	0.0529	-1.0068	68.8	-	-
76	38	1249	Oct 23	06:21:04	597	-9279	N	-h	1.5706	0.0089	-1.0564	28.5	-	-

SAROS SERIES

86

Saros series 86 contains 73 lunar eclipses.

PHASE													
DURATIONS													
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-38	-0074 Jul 13	23:31:40	11296 -25646	Nb	a-	1.5358	0.0136	-0.9345	31.3	-	-	
02	-37	-0056 Jul 24	07:06:57	11105 -25423	N	a-	1.4760	0.1250	-0.8264	94.0	-	-	
03	-36	-0038 Aug 04	14:47:55	10917 -25200	N	a-	1.4211	0.2278	-0.7276	126.0	-	-	
04	-35	-0020 Aug 14	22:34:46	10731 -24977	N	a-	1.3713	0.3213	-0.6384	148.7	-	-	
05	-34	-0002 Aug 26	06:29:14	10548 -24754	N	a-	1.3280	0.4031	-0.5612	165.7	-	-	
06	-33	0016 Sep 05	14:29:41	10367 -24531	N	a-	1.2900	0.4753	-0.4939	179.3	-	-	
07	-32	0034 Sep 16	22:38:50	10188 -24308	N	a-	1.2595	0.5338	-0.4403	189.5	-	-	
08	-31	0052 Sep 27	06:54:24	10010 -24085	N	a-	1.2345	0.5823	-0.3969	197.6	-	-	
09	-30	0070 Oct 08	15:17:47	9835 -23862	N	a-	1.2164	0.6178	-0.3662	203.4	-	-	
10	-29	0088 Oct 18	23:46:51	9660 -23639	N	a-	1.2034	0.6441	-0.3446	207.8	-	-	

11	-28	0106 Oct 30 08:22:39	9487 -23416	N a-	1.1964	0.6590	-0.3340	210.6	-	-
12	-27	0124 Nov 09 17:01:56	9314 -23193	N a-	1.1928	0.6677	-0.3292	212.5	-	-
13	-26	0142 Nov 21 01:44:36	9143 -22970	N a-	1.1925	0.6700	-0.3304	213.5	-	-
14	-25	0160 Dec 01 10:28:20	8971 -22747	N a-	1.1937	0.6693	-0.3340	214.0	-	-
15	-24	0178 Dec 12 19:12:35	8800 -22524	N a-	1.1964	0.6655	-0.3403	214.2	-	-
16	-23	0196 Dec 23 03:53:36	8630 -22301	N a-	1.1971	0.6653	-0.3423	214.8	-	-
17	-22	0215 Jan 03 12:31:27	8458 -22078	N a-	1.1960	0.6680	-0.3410	215.8	-	-
18	-21	0233 Jan 13 21:03:10	8287 -21855	N a-	1.1909	0.6777	-0.3323	217.8	-	-
19	-20	0251 Jan 25 05:29:35	8115 -21632	N a-	1.1825	0.6936	-0.3171	220.7	-	-
20	-19	0269 Feb 04 13:46:02	7943 -21409	N a-	1.1670	0.7221	-0.2888	225.2	-	-
21	-18	0287 Feb 15 21:55:26	7770 -21186	N a-	1.1467	0.7595	-0.2516	230.8	-	-
22	-17	0305 Feb 26 05:53:39	7596 -20963	N a-	1.1180	0.8122	-0.1990	238.2	-	-
23	-16	0323 Mar 09 13:43:57	7421 -20740	N h-	1.0838	0.8750	-0.1363	246.5	-	-
24	-15	0341 Mar 19 21:22:21	7246 -20517	N h-	1.0408	0.9540	-0.0575	256.1	-	-
25	-14	0359 Mar 31 04:53:11	7069 -20294	P h-	0.9923	1.0432	0.0312	266.2	40.8	-
26	-13	0377 Apr 10 12:13:33	6892 -20071	P t-	0.9360	1.1469	0.1341	277.0	83.6	-
27	-12	0395 Apr 21 19:26:17	6714 -19848	P t-	0.8742	1.2608	0.2470	287.9	112.1	-
28	-11	0413 May 02 02:30:17	6536 -19625	P t-	0.8058	1.3871	0.3717	298.8	135.4	-
29	-10	0431 May 13 09:29:00	6358 -19402	P t-	0.7338	1.5202	0.5028	309.2	154.9	-
30	-09	0449 May 23 16:21:54	6179 -19179	P t-	0.6578	1.6610	0.6411	319.0	171.6	-
31	-08	0467 Jun 03 23:10:33	6001 -18956	P t-	0.5792	1.8068	0.7839	328.1	185.9	-
32	-07	0485 Jun 14 05:56:53	5825 -18733	P t-	0.4992	1.9553	0.9289	336.3	197.9	-
33	-06	0503 Jun 25 12:42:21	5648 -18510	T t-	0.4191	2.1042	1.0738	343.4	207.8	42.8
34	-05	0521 Jul 05 19:28:10	5471 -18287	T p-	0.3402	2.2513	1.2164	349.5	215.6	70.1
35	-04	0539 Jul 17 02:15:12	5295 -18064	T+ pp	0.2631	2.3952	1.3554	354.6	221.7	85.7
36	-03	0557 Jul 27 09:06:13	5121 -17841	T+ pp	0.1900	2.5321	1.4871	358.7	226.1	95.3
37	-02	0575 Aug 07 16:01:52	4948 -17618	T+ pp	0.1212	2.6610	1.6104	362.0	229.1	101.1
38	-01	0593 Aug 17 23:02:30	4776 -17395	T+ pp	0.0572	2.7814	1.7251	364.5	230.9	104.1

39	00	0611 Aug 29 06:10:27	4605 -17172	T- pp	-0.0001	2.8891	1.8269	366.3	231.7	104.9
40	01	0629 Sep 08 13:25:57	4436 -16949	T- pp	-0.0505	2.7997	1.7317	367.7	231.8	104.2
41	02	0647 Sep 19 20:50:01	4269 -16726	T- pp	-0.0935	2.7236	1.6499	368.7	231.4	102.5
42	03	0665 Sep 30 04:20:51	4103 -16503	T- pp	-0.1304	2.6587	1.5795	369.5	230.7	100.2
43	04	0683 Oct 11 12:00:16	3939 -16280	T- pp	-0.1597	2.6075	1.5231	370.2	230.0	97.7
44	05	0701 Oct 21 19:46:39	3777 -16057	T- pp	-0.1828	2.5674	1.4783	370.8	229.3	95.4
45	06	0719 Nov 02 03:39:07	3617 -15834	T- pp	-0.2003	2.5374	1.4442	371.4	228.7	93.3
46	07	0737 Nov 12 11:36:54	3459 -15611	T- -p	-0.2130	2.5159	1.4191	372.0	228.3	91.6
47	08	0755 Nov 23 19:38:22	3305 -15388	T- -p	-0.2222	2.5005	1.4010	372.5	228.0	90.4
48	09	0773 Dec 04 03:42:30	3153 -15165	T- -p	-0.2288	2.4894	1.3879	373.0	227.8	89.4
49	10	0791 Dec 15 11:45:36	3004 -14942	T- -p	-0.2357	2.4772	1.3746	373.3	227.7	88.4
50	11	0809 Dec 25 19:48:48	2858 -14719	T- -p	-0.2422	2.4654	1.3624	373.5	227.5	87.5
51	12	0828 Jan 06 03:47:56	2716 -14496	T- -p	-0.2513	2.4486	1.3460	373.4	227.1	86.1
52	13	0846 Jan 16 11:43:00	2577 -14273	T- -p	-0.2638	2.4251	1.3237	373.0	226.5	84.1
53	14	0864 Jan 27 19:30:38	2443 -14050	T -p	-0.2821	2.3906	1.2910	372.2	225.4	80.8
54	15	0882 Feb 07 03:12:24	2312 -13827	T -p	-0.3049	2.3475	1.2502	371.1	223.9	76.2
55	16	0900 Feb 18 10:45:18	2185 -13604	T -p	-0.3349	2.2910	1.1967	369.3	221.6	68.9
56	17	0918 Feb 28 18:09:14	2062 -13381	T -t	-0.3721	2.2212	1.1301	366.9	218.3	57.4
57	18	0936 Mar 11 01:23:54	1944 -13158	T -t	-0.4167	2.1375	1.0498	363.8	213.8	36.4
58	19	0954 Mar 22 08:29:52	1831 -12935	P -t	-0.4686	2.0404	0.9564	359.6	207.7	-
59	20	0972 Apr 01 15:26:56	1721 -12712	P -t	-0.5277	1.9302	0.8499	354.4	199.6	-
60	21	0990 Apr 12 22:15:53	1617 -12489	P -t	-0.5933	1.8081	0.7313	347.8	189.0	-
61	22	1008 Apr 23 04:57:48	1517 -12266	P -t	-0.6646	1.6754	0.6021	339.7	175.1	-
62	23	1026 May 04 11:34:12	1422 -12043	P -t	-0.7406	1.5344	0.4643	330.1	157.1	-
63	24	1044 May 14 18:04:40	1331 -11820	P -t	-0.8213	1.3848	0.3177	318.4	132.7	-
64	25	1062 May 26 00:32:48	1245 -11597	P -t	-0.9039	1.2319	0.1674	304.9	98.4	-
65	26	1080 Jun 05 06:58:39	1163 -11374	P -t	-0.9885	1.0755	0.0133	289.1	28.3	-
66	27	1098 Jun 16 13:25:58	1086 -11151	N -t	-1.0720	0.9213	-0.1390	271.4	-	-

67	28	1116	Jun 26	19:52:58	1013 -10928	N	-t	-1.1559	0.7667	-0.2921	250.9	-	-
68	29	1134	Jul 08	02:25:23	944 -10705	N	-t	-1.2357	0.6196	-0.4382	228.3	-	-
69	30	1152	Jul 18	09:01:03	880 -10482	N	-t	-1.3134	0.4768	-0.5803	202.6	-	-
70	31	1170	Jul 29	15:44:25	820 -10259	N	-t	-1.3850	0.3451	-0.7115	174.1	-	-
71	32	1188	Aug 08	22:33:11	763 -10036	N	-t	-1.4527	0.2210	-0.8357	140.5	-	-
72	33	1206	Aug 20	05:32:45	710 -9813	N	-t	-1.5124	0.1115	-0.9453	100.6	-	-
73	34	1224	Aug 30	12:40:13	660 -9590	Ne	-t	-1.5663	0.0127	-1.0445	34.1	-	-

SAROS SERIES

87

Saros series 87 contains 73 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-33	0027 Aug 06	05:04:30	10258 -24396	N	t-	-1.5179	0.1084	-0.9625	101.0	-	-		
02	-32	0045 Aug 16	11:57:07	10080 -24173	N	t-	-1.4587	0.2194	-0.8563	142.6	-	-		

03	-31	0063	Aug 27	18:58:15	9904	-23950	N	t-	-1.4061	0.3185	-0.7620	170.7	-	-
04	-30	0081	Sep 07	02:08:15	9729	-23727	N	t-	-1.3606	0.4043	-0.6809	191.3	-	-
05	-29	0099	Sep 18	09:25:31	9555	-23504	N	t-	-1.3209	0.4794	-0.6102	207.3	-	-
06	-28	0117	Sep 28	16:53:03	9382	-23281	N	t-	-1.2892	0.5397	-0.5542	219.0	-	-
07	-27	0135	Oct 10	00:28:11	9210	-23058	N	t-	-1.2635	0.5888	-0.5088	228.1	-	-
08	-26	0153	Oct 20	08:12:17	9039	-22835	N	t-	-1.2447	0.6248	-0.4761	234.5	-	-
09	-25	0171	Oct 31	16:01:23	8868	-22612	N	t-	-1.2299	0.6534	-0.4502	239.3	-	-
10	-24	0189	Nov 10	23:57:48	8697	-22389	N	t-	-1.2208	0.6710	-0.4345	242.3	-	-
11	-23	0207	Nov 22	07:56:46	8526	-22166	N	t-	-1.2136	0.6848	-0.4218	244.5	-	-
12	-22	0225	Dec 02	15:58:28	8355	-21943	N	t-	-1.2085	0.6945	-0.4125	246.0	-	-
13	-21	0243	Dec 13	23:59:41	8183	-21720	N	t-	-1.2027	0.7049	-0.4016	247.5	-	-
14	-20	0261	Dec 24	08:00:34	8011	-21497	N	t-	-1.1962	0.7161	-0.3891	249.0	-	-
15	-19	0280	Jan 04	15:57:05	7838	-21274	N	t-	-1.1860	0.7337	-0.3694	251.3	-	-
16	-18	0298	Jan 14	23:49:19	7665	-21051	N	t-	-1.1720	0.7580	-0.3423	254.5	-	-
17	-17	0316	Jan 26	07:35:14	7490	-20828	N	t-	-1.1524	0.7922	-0.3046	258.8	-	-
18	-16	0334	Feb 05	15:15:09	7315	-20605	N	t-	-1.1273	0.8361	-0.2566	264.2	-	-
19	-15	0352	Feb 16	22:45:16	7139	-20382	N	t-	-1.0938	0.8953	-0.1928	271.2	-	-
20	-14	0370	Feb 27	06:08:40	6962	-20159	N	t-	-1.0544	0.9653	-0.1181	278.8	-	-
21	-13	0388	Mar 09	13:22:21	6785	-19936	Nx	t-	-1.0063	1.0509	-0.0275	287.6	-	-
22	-12	0406	Mar 20	20:29:58	6607	-19713	P	t-	-0.9525	1.1471	0.0739	296.5	66.0	-
23	-11	0424	Mar 31	03:27:25	6428	-19490	P	t-	-0.8896	1.2599	0.1918	305.9	104.3	-
24	-10	0442	Apr 11	10:20:22	6250	-19267	P	t-	-0.8222	1.3810	0.3179	314.9	131.6	-
25	-09	0460	Apr 21	17:05:19	6072	-19044	P	t-	-0.7478	1.5153	0.4569	323.7	154.1	-
26	-08	0478	May 02	23:47:14	5894	-18821	P	t-	-0.6698	1.6560	0.6022	331.6	172.5	-
27	-07	0496	May 13	06:24:02	5718	-18598	P	t-	-0.5867	1.8065	0.7568	338.6	187.9	-
28	-06	0514	May 24	13:00:56	5541	-18375	P	t-	-0.5027	1.9586	0.9129	344.5	200.3	-
29	-05	0532	Jun 03	19:36:27	5365	-18152	T	t-	-0.4168	2.1145	1.0721	349.2	210.1	42.8
30	-04	0550	Jun 15	02:13:49	5190	-17929	T	t-	-0.3314	2.2698	1.2303	352.7	217.6	72.4

31	-03	0568	Jun 25	08:53:42	5016	-17706	T-	p-	-0.2473	2.4230	1.3859	355.0	222.8	88.3
32	-02	0586	Jul 06	15:38:20	4844	-17483	T-	pp	-0.1662	2.5707	1.5357	356.1	226.1	97.6
33	-01	0604	Jul 16	22:28:47	4673	-17260	T-	pp	-0.0887	2.7121	1.6786	356.3	227.7	102.5
34	00	0622	Jul 28	05:25:43	4503	-17037	T-	pp	-0.0157	2.8455	1.8131	355.5	227.9	104.1
35	01	0640	Aug 07	12:31:44	4335	-16814	T+	pp	0.0507	2.7809	1.7492	354.1	226.9	103.2
36	02	0658	Aug 18	19:46:17	4168	-16591	T+	pp	0.1108	2.6703	1.6392	352.2	225.1	100.5
37	03	0676	Aug 29	03:10:50	4003	-16368	T+	pp	0.1636	2.5733	1.5424	350.0	222.7	96.5
38	04	0694	Sep 09	10:45:10	3840	-16145	T+	pp	0.2093	2.4895	1.4587	347.7	220.1	91.6
39	05	0712	Sep 19	18:30:19	3680	-15922	T+	-p	0.2470	2.4203	1.3896	345.3	217.4	86.5
40	06	0730	Oct 01	02:25:09	3521	-15699	T	-p	0.2772	2.3647	1.3342	343.1	214.9	81.5
41	07	0748	Oct 11	10:28:52	3365	-15476	T	-p	0.3009	2.3211	1.2908	341.0	212.6	77.0
42	08	0766	Oct 22	18:41:39	3212	-15253	T	-p	0.3179	2.2896	1.2599	339.1	210.8	73.4
43	09	0784	Nov 02	03:02:29	3062	-15030	T	-p	0.3292	2.2684	1.2396	337.5	209.3	70.8
44	10	0802	Nov 13	11:29:30	2915	-14807	T	-p	0.3360	2.2552	1.2277	336.0	208.2	69.1
45	11	0820	Nov 23	20:01:23	2772	-14584	T	-p	0.3396	2.2478	1.2220	334.6	207.4	68.2
46	12	0838	Dec 05	04:36:36	2632	-14361	T	-p	0.3412	2.2436	1.2203	333.4	206.8	67.8
47	13	0856	Dec 15	13:14:16	2495	-14138	T	-p	0.3417	2.2413	1.2209	332.1	206.3	67.7
48	14	0874	Dec 26	21:50:44	2363	-13915	T	-p	0.3440	2.2353	1.2185	330.7	205.6	67.3
49	15	0893	Jan 06	06:26:50	2234	-13692	T	-p	0.3474	2.2271	1.2142	329.2	205.0	66.6
50	16	0911	Jan 17	14:58:46	2110	-13469	T	-p	0.3551	2.2106	1.2022	327.5	203.9	64.8
51	17	0929	Jan 27	23:27:27	1990	-13246	T	-p	0.3661	2.1878	1.1844	325.5	202.7	62.2
52	18	0947	Feb 08	07:48:45	1875	-13023	T	-p	0.3842	2.1521	1.1539	323.2	200.8	57.3
53	19	0965	Feb 18	16:05:35	1764	-12800	T	-p	0.4066	2.1081	1.1155	320.5	198.4	50.1
54	20	0983	Mar 02	00:14:18	1658	-12577	T	-p	0.4367	2.0502	1.0631	317.3	195.2	37.6
55	21	1001	Mar 12	08:16:18	1556	-12354	P	-a	0.4728	1.9809	0.9995	313.6	191.1	-
56	22	1019	Mar 23	16:10:23	1459	-12131	P	-a	0.5161	1.8988	0.9229	309.2	185.8	-
57	23	1037	Apr 02	23:58:30	1366	-11908	P	-a	0.5649	1.8067	0.8360	304.1	179.1	-
58	24	1055	Apr 14	07:40:05	1278	-11685	P	-a	0.6197	1.7035	0.7378	298.1	170.7	-

59	25	1073	Apr 24	15:15:43	1195 -11462	P	-a	0.6800	1.5906	0.6295	291.2	160.2	-
60	26	1091	May 05	22:46:58	1116 -11239	P	-a	0.7444	1.4704	0.5133	283.1	147.0	-
61	27	1109	May 16	06:14:47	1041 -11016	P	-a	0.8119	1.3447	0.3912	274.0	130.5	-
62	28	1127	May 27	13:39:51	971 -10793	P	-a	0.8822	1.2143	0.2637	263.6	108.9	-
63	29	1145	Jun 06	21:03:47	905 -10570	P	-a	0.9538	1.0817	0.1333	251.9	78.8	-
64	30	1163	Jun 18	04:27:57	843 -10347	P	-a	1.0257	0.9490	0.0023	238.8	10.6	-
65	31	1181	Jun 28	11:53:59	785 -10124	N	-a	1.0961	0.8193	-0.1263	224.6	-	-
66	32	1199	Jul 09	19:21:31	730 -9901	N	-a	1.1656	0.6915	-0.2538	208.7	-	-
67	33	1217	Jul 20	02:53:32	680 -9678	N	-a	1.2316	0.5706	-0.3750	191.7	-	-
68	34	1235	Jul 31	10:29:18	632 -9455	N	-a	1.2947	0.4553	-0.4911	173.0	-	-
69	35	1253	Aug 10	18:11:53	588 -9232	N	-a	1.3524	0.3501	-0.5976	153.2	-	-
70	36	1271	Aug 22	01:59:09	546 -9009	N	-a	1.4063	0.2520	-0.6976	131.1	-	-
71	37	1289	Sep 01	09:55:12	507 -8786	N	-a	1.4531	0.1673	-0.7846	107.6	-	-
72	38	1307	Sep 12	17:57:27	471 -8563	N	-a	1.4952	0.0914	-0.8630	80.2	-	-
73	39	1325	Sep 23	02:08:36	437 -8340	Ne	-a	1.5302	0.0286	-0.9286	45.1	-	-

SAROS SERIES

88

Saros series 88 contains 72 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-36	0038 Jul 05 07:09:37	10150 -24261	Nb h-	1.5077	0.0952	-0.9125	88.4	-	-	-	-	-	-
02	-35	0056 Jul 15 14:15:13	9973 -24038	N a-	1.4325	0.2324	-0.7736	135.9	-	-	-	-	-	-
03	-34	0074 Jul 26 21:28:30	9798 -23815	N a-	1.3622	0.3608	-0.6439	166.7	-	-	-	-	-	-
04	-33	0092 Aug 06 04:50:08	9624 -23592	N a-	1.2972	0.4797	-0.5242	189.4	-	-	-	-	-	-
05	-32	0110 Aug 17 12:21:04	9450 -23369	N a-	1.2387	0.5866	-0.4167	206.6	-	-	-	-	-	-
06	-31	0128 Aug 27 20:01:05	9278 -23146	N a-	1.1866	0.6821	-0.3210	219.9	-	-	-	-	-	-
07	-30	0146 Sep 08 03:51:17	9107 -22923	N a-	1.1418	0.7644	-0.2386	230.2	-	-	-	-	-	-
08	-29	0164 Sep 18 11:51:25	8935 -22700	N a-	1.1041	0.8336	-0.1695	237.9	-	-	-	-	-	-
09	-28	0182 Sep 29 20:00:09	8764 -22477	N a-	1.0728	0.8909	-0.1121	243.8	-	-	-	-	-	-
10	-27	0200 Oct 10 04:18:39	8594 -22254	N a-	1.0489	0.9348	-0.0681	247.9	-	-	-	-	-	-
11	-26	0218 Oct 21 12:44:34	8422 -22031	N a-	1.0308	0.9678	-0.0347	250.6	-	-	-	-	-	-
12	-25	0236 Oct 31 21:18:31	8251 -21808	N a-	1.0185	0.9900	-0.0118	252.2	-	-	-	-	-	-
13	-24	0254 Nov 12 05:56:12	8079 -21585	P a-	1.0088	1.0072	0.0064	253.2	18.0	-	-	-	-	-
14	-23	0272 Nov 22 14:39:36	7906 -21362	P a-	1.0035	1.0162	0.0170	253.3	29.1	-	-	-	-	-
15	-22	0290 Dec 03 23:24:25	7733 -21139	P a-	0.9992	1.0230	0.0259	253.3	35.8	-	-	-	-	-
16	-21	0308 Dec 14 08:10:56	7559 -20916	P a-	0.9957	1.0281	0.0335	253.1	40.5	-	-	-	-	-
17	-20	0326 Dec 25 16:55:15	7384 -20693	P a-	0.9904	1.0365	0.0449	253.1	46.7	-	-	-	-	-
18	-19	0345 Jan 05 01:38:25	7209 -20470	P a-	0.9835	1.0473	0.0592	253.4	53.5	-	-	-	-	-
19	-18	0363 Jan 16 10:17:04	7032 -20247	P a-	0.9727	1.0651	0.0809	254.3	62.2	-	-	-	-	-
20	-17	0381 Jan 26 18:50:52	6855 -20024	P a-	0.9577	1.0905	0.1106	255.9	72.3	-	-	-	-	-
21	-16	0399 Feb 07 03:18:16	6677 -19801	P a-	0.9372	1.1259	0.1504	258.3	83.7	-	-	-	-	-

22	-15	0417 Feb 17	11:39:28	6499 -19578	P	a-	0.9112	1.1712	0.2003	261.4	95.8	-
23	-14	0435 Feb 28	19:52:28	6320 -19355	P	a-	0.8783	1.2293	0.2630	265.3	108.6	-
24	-13	0453 Mar 11	03:58:27	6142 -19132	P	a-	0.8392	1.2988	0.3371	269.9	121.5	-
25	-12	0471 Mar 22	11:56:40	5964 -18909	P	a-	0.7934	1.3805	0.4231	275.0	134.2	-
26	-11	0489 Apr 01	19:48:58	5787 -18686	P	a-	0.7426	1.4719	0.5185	280.3	146.3	-
27	-10	0507 Apr 13	03:32:37	5611 -18463	P	a-	0.6842	1.5772	0.6275	285.9	158.0	-
28	-09	0525 Apr 23	11:12:15	5434 -18240	P	a-	0.6221	1.6895	0.7429	291.3	168.6	-
29	-08	0543 May 04	18:45:44	5259 -18017	P	a-	0.5545	1.8123	0.8682	296.6	178.3	-
30	-07	0561 May 15	02:17:07	5084 -17794	P	a-	0.4850	1.9387	0.9967	301.3	186.7	-
31	-06	0579 May 26	09:43:51	4911 -17571	T	a-	0.4114	2.0731	1.1325	305.6	194.0	52.3
32	-05	0597 Jun 05	17:11:22	4740 -17348	T	p-	0.3381	2.2072	1.2673	309.2	199.8	71.2
33	-04	0615 Jun 17	00:37:32	4570 -17125	T+	p-	0.2633	2.3446	1.4046	312.2	204.5	83.5
34	-03	0633 Jun 27	08:05:29	4401 -16902	T+	p-	0.1899	2.4795	1.5390	314.5	207.9	91.5
35	-02	0651 Jul 08	15:34:40	4234 -16679	T+	pp	0.1175	2.6130	1.6712	316.2	210.2	96.4
36	-01	0669 Jul 18	23:08:32	4068 -16456	T+	pp	0.0490	2.7396	1.7959	317.2	211.3	98.9
37	00	0687 Jul 30	06:46:23	3904 -16233	T-	pp	-0.0161	2.8012	1.8550	317.8	211.6	99.3
38	01	0705 Aug 09	14:29:23	3743 -16010	T-	pp	-0.0769	2.6912	1.7421	317.9	211.0	98.0
39	02	0723 Aug 20	22:18:59	3583 -15787	T-	p	-0.1319	2.5920	1.6394	317.7	209.9	95.4
40	03	0741 Aug 31	06:15:24	3427 -15564	T-	p	-0.1810	2.5039	1.5475	317.3	208.5	91.8
41	04	0759 Sep 11	14:19:21	3272 -15341	T-	p	-0.2234	2.4281	1.4677	316.9	206.8	87.6
42	05	0777 Sep 21	22:29:48	3121 -15118	T-	p	-0.2601	2.3629	1.3983	316.5	205.0	83.0
43	06	0795 Oct 03	06:48:40	2973 -14895	T	p	-0.2895	2.3110	1.3421	316.2	203.5	78.5
44	07	0813 Oct 13	15:14:00	2828 -14672	T	p	-0.3133	2.2694	1.2965	316.0	202.1	74.3
45	08	0831 Oct 24	23:46:04	2686 -14449	T	p	-0.3310	2.2389	1.2620	316.1	201.0	70.7
46	09	0849 Nov 04	08:23:41	2549 -14226	T	p	-0.3439	2.2172	1.2366	316.4	200.3	67.8
47	10	0867 Nov 15	17:06:44	2415 -14003	T	p	-0.3516	2.2047	1.2206	316.9	199.9	65.9
48	11	0885 Nov 26	01:52:31	2285 -13780	T	p	-0.3571	2.1962	1.2092	317.5	199.7	64.5
49	12	0903 Dec 07	10:40:03	2159 -13557	T	p	-0.3608	2.1906	1.2011	318.2	199.7	63.5

50	13	0921	Dec 17	19:27:42	2037	-13334	T	-p	-0.3639	2.1859	1.1944	318.9	199.8	62.7
51	14	0939	Dec 29	04:14:47	1920	-13111	T	-p	-0.3669	2.1811	1.1881	319.6	200.0	61.9
52	15	0958	Jan 08	12:57:28	1807	-12888	T	-p	-0.3733	2.1700	1.1760	320.1	199.8	60.2
53	16	0976	Jan 19	21:36:18	1699	-12665	T	-a	-0.3823	2.1539	1.1591	320.4	199.5	57.7
54	17	0994	Jan 30	06:07:59	1595	-12442	T	-a	-0.3967	2.1275	1.1325	320.4	198.7	53.2
55	18	1012	Feb 10	14:34:00	1496	-12219	T	-a	-0.4153	2.0935	1.0984	320.2	197.5	46.5
56	19	1030	Feb 20	22:49:33	1402	-11996	T	-a	-0.4416	2.0450	1.0500	319.5	195.4	33.7
57	20	1048	Mar 03	06:58:13	1312	-11773	P	-a	-0.4731	1.9873	0.9924	318.3	192.6	-
58	21	1066	Mar 14	14:55:47	1227	-11550	P	-a	-0.5131	1.9138	0.9190	316.4	188.4	-
59	22	1084	Mar 24	22:45:33	1146	-11327	P	-a	-0.5588	1.8300	0.8352	313.7	182.8	-
60	23	1102	Apr 05	06:24:14	1070	-11104	P	-a	-0.6129	1.7308	0.7357	310.0	175.0	-
61	24	1120	Apr 15	13:55:59	998	-10881	P	-a	-0.6720	1.6228	0.6270	305.2	165.0	-
62	25	1138	Apr 26	21:18:25	931	-10658	P	-a	-0.7379	1.5023	0.5055	299.0	151.6	-
63	26	1156	May 07	04:33:43	867	-10435	P	-a	-0.8089	1.3728	0.3747	291.3	133.6	-
64	27	1174	May 18	11:42:18	807	-10212	P	-a	-0.8845	1.2351	0.2350	281.8	108.3	-
65	28	1192	May 28	18:46:26	752	-9989	P	-a	-0.9629	1.0924	0.0898	270.3	68.6	-
66	29	1210	Jun 09	01:46:22	699	-9766	N	-h	-1.0435	0.9459	-0.0596	256.5	-	-
67	30	1228	Jun 19	08:43:27	650	-9543	N	-h	-1.1254	0.7974	-0.2116	240.2	-	-
68	31	1246	Jun 30	15:39:39	605	-9320	N	-h	-1.2069	0.6501	-0.3631	221.1	-	-
69	32	1264	Jul 10	22:36:10	562	-9097	N	-h	-1.2870	0.5053	-0.5124	198.6	-	-
70	33	1282	Jul 22	05:33:18	522	-8874	N	-h	-1.3653	0.3642	-0.6585	171.6	-	-
71	34	1300	Aug 01	12:33:39	485	-8651	N	-h	-1.4397	0.2303	-0.7978	138.8	-	-
72	35	1318	Aug 12	19:38:00	450	-8428	N	-h	-1.5096	0.1051	-0.9288	95.2	-	-

SAROS SERIES

89

Saros series 89 contains 72 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-37	0067 Jun 15 20:57:27	9867 -23903	Nb	a-	-1.5189	0.0432	-0.9019	55.6	-	-	-	-	-
02	-36	0085 Jun 26 04:21:20	9692 -23680	N	a-	-1.4500	0.1707	-0.7766	109.4	-	-	-	-	-
03	-35	0103 Jul 07 11:49:00	9519 -23457	N	a-	-1.3844	0.2925	-0.6578	141.9	-	-	-	-	-
04	-34	0121 Jul 17 19:19:08	9346 -23234	N	a-	-1.3213	0.4101	-0.5437	166.5	-	-	-	-	-
05	-33	0139 Jul 29 02:54:05	9174 -23011	N	a-	-1.2626	0.5199	-0.4379	186.1	-	-	-	-	-
06	-32	0157 Aug 08 10:34:05	9003 -22788	N	a-	-1.2082	0.6219	-0.3403	202.1	-	-	-	-	-
07	-31	0175 Aug 19 18:21:01	8832 -22565	N	a-	-1.1601	0.7127	-0.2544	215.0	-	-	-	-	-
08	-30	0193 Aug 30 02:14:16	8661 -22342	N	a-	-1.1176	0.7931	-0.1791	225.8	-	-	-	-	-
09	-29	0211 Sep 10 10:14:18	8490 -22119	N	a-	-1.0814	0.8623	-0.1153	234.5	-	-	-	-	-
10	-28	0229 Sep 20 18:21:52	8319 -21896	N	a-	-1.0522	0.9187	-0.0642	241.5	-	-	-	-	-
11	-27	0247 Oct 02 02:36:48	8147 -21673	N	a-	-1.0295	0.9631	-0.0253	247.0	-	-	-	-	-
12	-26	0265 Oct 12 10:58:04	7975 -21450	P	a-	-1.0125	0.9968	0.0033	251.3	12.8	-	-	-	-
13	-25	0283 Oct 23 19:26:01	7802 -21227	P	a-	-1.0017	1.0192	0.0207	254.5	32.2	-	-	-	-

14	-24	0301 Nov 03 03:58:53	7628 -21004	P a-	-0.9953	1.0331	0.0301	256.7	38.9	-
15	-23	0319 Nov 14 12:36:16	7453 -20781	P a-	-0.9934	1.0387	0.0315	258.2	39.9	-
16	-22	0337 Nov 24 21:14:46	7278 -20558	P a-	-0.9930	1.0414	0.0306	259.4	39.4	-
17	-21	0355 Dec 06 05:55:51	7102 -20335	P a-	-0.9951	1.0390	0.0251	260.0	35.8	-
18	-20	0373 Dec 16 14:35:11	6925 -20112	P a-	-0.9961	1.0384	0.0220	260.8	33.6	-
19	-19	0391 Dec 27 23:13:03	6747 -19889	P a-	-0.9968	1.0382	0.0198	261.7	32.0	-
20	-18	0410 Jan 07 07:45:13	6569 -19666	P a-	-0.9934	1.0452	0.0254	263.2	36.3	-
21	-17	0428 Jan 18 16:13:16	6390 -19443	P a-	-0.9874	1.0567	0.0359	265.2	43.2	-
22	-16	0446 Jan 29 00:33:14	6212 -19220	P a-	-0.9752	1.0793	0.0578	268.2	54.8	-
23	-15	0464 Feb 09 08:45:14	6034 -18997	P a-	-0.9576	1.1119	0.0900	272.1	68.4	-
24	-14	0482 Feb 19 16:47:26	5857 -18774	P a-	-0.9326	1.1578	0.1357	277.2	83.7	-
25	-13	0500 Mar 02 00:40:27	5681 -18551	P h-	-0.9011	1.2156	0.1934	283.2	99.4	-
26	-12	0518 Mar 13 08:23:11	5504 -18328	P h-	-0.8620	1.2876	0.2652	290.1	115.5	-
27	-11	0536 Mar 23 15:55:39	5328 -18105	P t-	-0.8153	1.3734	0.3508	297.7	131.7	-
28	-10	0554 Apr 03 23:18:17	5153 -17882	P t-	-0.7612	1.4729	0.4498	305.8	147.3	-
29	-09	0572 Apr 14 06:32:05	4980 -17659	P t-	-0.7009	1.5839	0.5601	314.1	162.1	-
30	-08	0590 Apr 25 13:36:38	4807 -17436	P t-	-0.6336	1.7078	0.6829	322.4	176.1	-
31	-07	0608 May 05 20:34:34	4637 -17213	P t-	-0.5617	1.8407	0.8142	330.3	188.6	-
32	-06	0626 May 17 03:25:41	4467 -16990	P t-	-0.4850	1.9823	0.9539	337.8	199.8	-
33	-05	0644 May 27 10:13:17	4299 -16767	T t-	-0.4060	2.1286	1.0977	344.5	209.3	48.9
34	-04	0662 Jun 07 16:55:29	4133 -16544	T pp	-0.3234	2.2816	1.2478	350.5	217.2	74.3
35	-03	0680 Jun 17 23:37:13	3969 -16321	T- pp	-0.2413	2.4340	1.3968	355.4	223.3	89.2
36	-02	0698 Jun 29 06:17:01	3806 -16098	T- pp	-0.1585	2.5877	1.5467	359.3	227.7	98.6
37	-01	0716 Jul 09 12:59:00	3646 -15875	T- pp	-0.0782	2.7372	1.6920	362.3	230.4	103.7
38	00	0734 Jul 20 19:41:42	3488 -15652	T+ pp	0.0006	2.8821	1.8322	364.3	231.6	105.3
39	01	0752 Jul 31 02:29:52	3333 -15429	T+ pp	0.0741	2.7497	1.6949	365.4	231.4	103.9
40	02	0770 Aug 11 09:22:06	3180 -15206	T+ pp	0.1431	2.6256	1.5655	365.8	230.1	99.9

41	03	0788	Aug 21	16:20:45	3031	-14983	T+	pp	0.2061	2.5127	1.4473	365.6	227.8	93.6
42	04	0806	Sep 01	23:26:04	2885	-14760	T+	-p	0.2630	2.4111	1.3402	365.0	224.9	85.3
43	05	0824	Sep 12	06:39:37	2742	-14537	T	-p	0.3125	2.3230	1.2466	364.2	221.6	75.2
44	06	0842	Sep 23	14:01:24	2603	-14314	T	-t	0.3546	2.2485	1.1669	363.3	218.3	63.7
45	07	0860	Oct 03	21:30:19	2467	-14091	T	-t	0.3903	2.1855	1.0990	362.5	215.0	50.2
46	08	0878	Oct 15	05:08:15	2335	-13868	T	-t	0.4180	2.1369	1.0457	361.8	212.2	34.7
47	09	0896	Oct 25	12:52:55	2208	-13645	T	-t	0.4402	2.0984	1.0030	361.3	209.8	9.1
48	10	0914	Nov 05	20:44:43	2085	-13422	P	-t	0.4561	2.0708	0.9720	361.0	207.9	-
49	11	0932	Nov 16	04:40:50	1966	-13199	P	-t	0.4684	2.0498	0.9481	360.8	206.5	-
50	12	0950	Nov 27	12:41:45	1851	-12976	P	-t	0.4766	2.0359	0.9321	360.8	205.5	-
51	13	0968	Dec 07	20:43:51	1741	-12753	P	-t	0.4836	2.0237	0.9185	360.7	204.6	-
52	14	0986	Dec 19	04:46:27	1636	-12530	P	-t	0.4900	2.0120	0.9064	360.4	203.9	-
53	15	1004	Dec 29	12:47:12	1535	-12307	P	-t	0.4980	1.9973	0.8920	360.0	202.9	-
54	16	1023	Jan 09	20:45:36	1439	-12084	P	-t	0.5079	1.9787	0.8744	359.1	201.6	-
55	17	1041	Jan 20	04:37:49	1347	-11861	P	-t	0.5226	1.9507	0.8483	357.8	199.5	-
56	18	1059	Jan 31	12:24:30	1260	-11638	P	-t	0.5417	1.9144	0.8144	355.8	196.7	-
57	19	1077	Feb 10	20:03:13	1178	-11415	P	-t	0.5673	1.8658	0.7690	353.1	192.7	-
58	20	1095	Feb 22	03:35:10	1100	-11192	P	-t	0.5987	1.8065	0.7131	349.6	187.3	-
59	21	1113	Mar 04	10:56:15	1026	-10969	P	-t	0.6388	1.7309	0.6414	344.9	179.7	-
60	22	1131	Mar 15	18:10:31	957	-10746	P	-t	0.6846	1.6449	0.5594	339.2	170.1	-
61	23	1149	Mar 26	01:14:23	892	-10523	P	-t	0.7387	1.5435	0.4622	331.9	156.9	-
62	24	1167	Apr 06	08:12:22	830	-10300	P	-t	0.7979	1.4327	0.3557	323.3	139.8	-
63	25	1185	Apr 16	15:00:13	773	-10077	P	-t	0.8654	1.3067	0.2338	312.4	115.3	-
64	26	1203	Apr 27	21:44:13	719	-9854	P	-t	0.9364	1.1745	0.1056	299.8	78.8	-
65	27	1221	May 08	04:20:55	669	-9631	Nx	-t	1.0129	1.0322	-0.0330	284.7	-	-
66	28	1239	May 19	10:55:10	622	-9408	N	-t	1.0917	0.8859	-0.1758	267.1	-	-
67	29	1257	May 29	17:25:28	579	-9185	N	-t	1.1736	0.7340	-0.3247	246.2	-	-
68	30	1275	Jun 09	23:56:24	538	-8962	N	-t	1.2550	0.5833	-0.4726	222.1	-	-

69	31	1293	Jun 20	06:27:25	500	-8739	N	-t	1.3364	0.4329	-0.6208	193.6	-	-
70	32	1311	Jul 01	13:00:36	464	-8516	N	-t	1.4161	0.2856	-0.7662	159.0	-	-
71	33	1329	Jul 11	19:37:15	430	-8293	N	-t	1.4929	0.1439	-0.9065	114.0	-	-
72	34	1347	Jul 23	02:19:29	399	-8070	Ne	-t	1.5654	0.0105	-1.0388	31.0	-	-

SAROS SERIES

90

Saros series 90 contains 72 lunar eclipses.

													PHASE
													DURATIONS
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-34	0150 Jun 27	19:18:39	9071	-22876	Nb t-	1.5618	0.0232	-1.0383	46.9	-	-	
02	-33	0168 Jul 08	01:47:33	8899	-22653	N t-	1.4833	0.1689	-0.8958	125.2	-	-	
03	-32	0186 Jul 19	08:22:09	8728	-22430	N t-	1.4088	0.3073	-0.7611	167.2	-	-	
04	-31	0204 Jul 29	15:00:30	8557	-22207	N t-	1.3371	0.4409	-0.6314	198.3	-	-	
05	-30	0222 Aug 09	21:46:20	8386	-21984	N t-	1.2713	0.5637	-0.5126	222.1	-	-	

06	-29	0240	Aug 20	04:37:52	8215	-21761	N	t-	1.2099	0.6784	-0.4021	241.4	-	-
07	-28	0258	Aug 31	11:39:32	8043	-21538	N	t-	1.1564	0.7787	-0.3060	256.6	-	-
08	-27	0276	Sep 10	18:48:49	7870	-21315	N	t-	1.1088	0.8681	-0.2206	268.9	-	-
09	-26	0294	Sep 22	02:07:28	7697	-21092	N	t-	1.0685	0.9441	-0.1485	278.7	-	-
10	-25	0312	Oct 02	09:34:39	7522	-20869	Nx	t-	1.0348	1.0077	-0.0885	286.3	-	-
11	-24	0330	Oct 13	17:11:45	7347	-20646	Nx	t-	1.0093	1.0560	-0.0433	291.9	-	-
12	-23	0348	Oct 24	00:56:02	7171	-20423	Nx	t-	0.9890	1.0946	-0.0072	296.1	-	-
13	-22	0366	Nov 04	08:47:09	6995	-20200	P	t-	0.9740	1.1230	0.0193	299.1	34.3	-
14	-21	0384	Nov 14	16:43:27	6817	-19977	P	t-	0.9629	1.1441	0.0391	301.2	48.7	-
15	-20	0402	Nov 26	00:44:37	6639	-19754	P	t-	0.9555	1.1578	0.0524	302.5	56.2	-
16	-19	0420	Dec 06	08:46:28	6461	-19531	P	t-	0.9486	1.1704	0.0653	303.5	62.6	-
17	-18	0438	Dec 17	16:49:55	6283	-19308	P	t-	0.9427	1.1806	0.0767	304.1	67.7	-
18	-17	0456	Dec 28	00:50:43	6104	-19085	P	t-	0.9344	1.1947	0.0929	305.0	74.2	-
19	-16	0475	Jan 08	08:49:33	5927	-18862	P	t-	0.9242	1.2121	0.1130	306.1	81.6	-
20	-15	0493	Jan 18	16:41:33	5750	-18639	P	t-	0.9082	1.2397	0.1441	308.0	91.6	-
21	-14	0511	Jan 30	00:29:38	5573	-18416	P	t-	0.8886	1.2736	0.1822	310.3	102.3	-
22	-13	0529	Feb 09	08:09:09	5397	-18193	P	t-	0.8621	1.3199	0.2331	313.4	114.6	-
23	-12	0547	Feb 20	15:41:42	5222	-17970	P	t-	0.8290	1.3780	0.2962	317.2	127.8	-
24	-11	0565	Mar 02	23:04:59	5048	-17747	P	t-	0.7879	1.4508	0.3743	321.7	141.7	-
25	-10	0583	Mar 14	06:21:40	4875	-17524	P	t-	0.7406	1.5347	0.4638	326.5	155.3	-
26	-09	0601	Mar 24	13:29:56	4704	-17301	P	t-	0.6858	1.6326	0.5672	331.7	168.6	-
27	-08	0619	Apr 04	20:30:48	4534	-17078	P	t-	0.6240	1.7431	0.6832	336.8	181.1	-
28	-07	0637	Apr 15	03:25:41	4365	-16855	P	t-	0.5564	1.8644	0.8099	341.7	192.5	-
29	-06	0655	Apr 26	10:15:24	4198	-16632	P	t-	0.4834	1.9959	0.9466	346.1	202.5	-
30	-05	0673	May 06	17:01:08	4033	-16409	T	t-	0.4061	2.1352	1.0907	349.9	211.0	47.6
31	-04	0691	May 17	23:43:54	3870	-16186	T	t-	0.3254	2.2810	1.2410	352.8	217.9	73.7
32	-03	0709	May 28	06:26:03	3709	-15963	T+	p-	0.2431	2.4301	1.3941	354.8	222.9	88.9
33	-02	0727	Jun 08	13:08:30	3550	-15740	T+	pp	0.1598	2.5810	1.5486	355.7	226.2	98.2

34	-01	0745	Jun 18	19:51:37	3394	-15517	T+	pp	0.0762	2.7330	1.7036	355.7	227.9	103.1
35	00	0763	Jun 30	02:38:41	3240	-15294	T-	pp	-0.0052	2.8620	1.8352	354.6	227.9	104.3
36	01	0781	Jul 10	09:29:49	3090	-15071	T-	pp	-0.0842	2.7159	1.6913	352.7	226.4	102.3
37	02	0799	Jul 21	16:27:53	2942	-14848	T-	pp	-0.1584	2.5789	1.5559	350.1	223.6	97.5
38	03	0817	Jul 31	23:31:43	2798	-14625	T-	pp	-0.2288	2.4491	1.4274	346.8	219.8	89.9
39	04	0835	Aug 12	06:45:13	2657	-14402	T	-p	-0.2922	2.3323	1.3114	343.1	215.3	79.9
40	05	0853	Aug 22	14:06:49	2520	-14179	T	-p	-0.3500	2.2260	1.2057	339.2	210.3	67.2
41	06	0871	Sep 02	21:38:28	2387	-13956	T	-p	-0.4002	2.1336	1.1137	335.3	205.1	51.3
42	07	0889	Sep 13	05:19:21	2258	-13733	T	-p	-0.4438	2.0537	1.0339	331.5	200.0	28.6
43	08	0907	Sep 24	13:11:11	2133	-13510	P	-a	-0.4793	1.9884	0.9688	328.0	195.3	-
44	09	0925	Oct 04	21:12:36	2012	-13287	P	-a	-0.5078	1.9360	0.9165	324.9	191.2	-
45	10	0943	Oct 16	05:22:35	1896	-13064	P	-a	-0.5302	1.8947	0.8756	322.1	187.7	-
46	11	0961	Oct 26	13:41:49	1784	-12841	P	-a	-0.5457	1.8660	0.8474	319.8	185.0	-
47	12	0979	Nov 06	22:08:13	1677	-12618	P	-a	-0.5557	1.8473	0.8296	318.0	183.1	-
48	13	0997	Nov 17	06:41:06	1574	-12395	P	-a	-0.5614	1.8362	0.8198	316.5	181.8	-
49	14	1015	Nov 28	15:17:02	1476	-12172	P	-a	-0.5651	1.8284	0.8138	315.1	180.8	-
50	15	1033	Dec 08	23:57:10	1383	-11949	P	-a	-0.5660	1.8256	0.8133	313.9	180.3	-
51	16	1051	Dec 20	08:37:46	1294	-11726	P	-a	-0.5669	1.8224	0.8130	312.7	179.9	-
52	17	1069	Dec 30	17:18:20	1210	-11503	P	-a	-0.5684	1.8179	0.8119	311.4	179.3	-
53	18	1088	Jan 11	01:56:01	1130	-11280	P	-a	-0.5727	1.8081	0.8059	309.9	178.4	-
54	19	1106	Jan 21	10:31:12	1055	-11057	P	-a	-0.5798	1.7929	0.7951	308.1	177.1	-
55	20	1124	Feb 01	19:00:48	984	-10834	P	-a	-0.5920	1.7681	0.7751	305.8	175.1	-
56	21	1142	Feb 12	03:24:57	917	-10611	P	-a	-0.6093	1.7339	0.7459	303.0	172.3	-
57	22	1160	Feb 23	11:42:25	854	-10388	P	-a	-0.6327	1.6884	0.7055	299.6	168.3	-
58	23	1178	Mar 05	19:53:46	795	-10165	P	-a	-0.6616	1.6328	0.6551	295.6	163.2	-
59	24	1196	Mar 16	03:56:40	740	-9942	P	-a	-0.6982	1.5628	0.5904	290.7	156.2	-
60	25	1214	Mar 27	11:53:30	689	-9719	P	-a	-0.7405	1.4827	0.5152	285.0	147.4	-
61	26	1232	Apr 06	19:42:43	641	-9496	P	-a	-0.7898	1.3899	0.4273	278.1	135.8	-

62	27	1250	Apr 18	03:27:09	596	-9273	P	-a	-0.8433	1.2895	0.3313	270.1	121.1	-
63	28	1268	Apr 28	11:03:47	554	-9050	P	-a	-0.9038	1.1765	0.2223	260.6	100.6	-
64	29	1286	May 09	18:38:06	514	-8827	P	-a	-0.9665	1.0596	0.1088	249.9	71.4	-
65	30	1304	May 20	02:07:02	478	-8604	N	-a	-1.0344	0.9336	-0.0142	237.3	-	-
66	31	1322	May 31	09:35:18	443	-8381	N	-a	-1.1028	0.8068	-0.1387	223.1	-	-
67	32	1340	Jun 10	17:00:17	411	-8158	N	-a	-1.1742	0.6750	-0.2688	206.5	-	-
68	33	1358	Jun 22	00:27:21	381	-7935	N	-a	-1.2441	0.5462	-0.3966	187.9	-	-
69	34	1376	Jul 02	07:54:03	352	-7712	N	-a	-1.3147	0.4166	-0.5258	166.0	-	-
70	35	1394	Jul 13	15:23:50	326	-7489	N	-a	-1.3829	0.2915	-0.6511	140.4	-	-
71	36	1412	Jul 23	22:56:30	300	-7266	N	-a	-1.4488	0.1710	-0.7726	108.7	-	-
72	37	1430	Aug 04	06:34:42	276	-7043	Ne	-a	-1.5105	0.0585	-0.8865	64.2	-	-

SAROS SERIES

91

Saros series 91 contains 72 lunar eclipses.

PHASE													
DURATIONS													
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m

GREATEST

ECLIPSE

01	-35	0179	Jun 07	04:36:23	8796	-22518	N	h-	-1.4922	0.1221	-0.8822	99.7	-	-
02	-34	0197	Jun 17	11:34:20	8625	-22295	N	a-	-1.4105	0.2703	-0.7308	145.8	-	-
03	-33	0215	Jun 28	18:35:59	8454	-22072	N	a-	-1.3306	0.4156	-0.5829	177.6	-	-
04	-32	0233	Jul 09	01:43:24	8283	-21849	N	a-	-1.2544	0.5544	-0.4420	201.6	-	-
05	-31	0251	Jul 20	08:55:40	8111	-21626	N	a-	-1.1810	0.6883	-0.3065	220.8	-	-
06	-30	0269	Jul 30	16:16:33	7938	-21403	N	a-	-1.1137	0.8113	-0.1825	235.9	-	-
07	-29	0287	Aug 10	23:44:14	7765	-21180	N	a-	-1.0511	0.9258	-0.0673	248.2	-	-
08	-28	0305	Aug 21	07:22:06	7591	-20957	P	a-	-0.9958	1.0270	0.0342	257.8	41.8	-
09	-27	0323	Sep 01	15:07:36	7416	-20734	P	a-	-0.9461	1.1182	0.1255	265.5	78.8	-
10	-26	0341	Sep 11	23:04:32	7241	-20511	P	a-	-0.9051	1.1935	0.2007	271.3	98.3	-
11	-25	0359	Sep 23	07:09:36	7064	-20288	P	a-	-0.8701	1.2579	0.2649	275.7	111.5	-
12	-24	0377	Oct 03	15:24:57	6887	-20065	P	a-	-0.8428	1.3080	0.3148	278.8	120.4	-
13	-23	0395	Oct 14	23:48:01	6710	-19842	P	a-	-0.8213	1.3475	0.3542	281.0	126.6	-
14	-22	0413	Oct 25	08:19:57	6531	-19619	P	a-	-0.8063	1.3749	0.3819	282.2	130.6	-
15	-21	0431	Nov 05	16:57:27	6353	-19396	P	a-	-0.7958	1.3940	0.4014	282.8	133.2	-
16	-20	0449	Nov 16	01:40:11	6175	-19173	P	a-	-0.7890	1.4060	0.4144	283.0	134.8	-
17	-19	0467	Nov 27	10:26:19	5997	-18950	P	a-	-0.7846	1.4134	0.4230	282.8	135.7	-
18	-18	0485	Dec 07	19:15:13	5820	-18727	P	a-	-0.7819	1.4174	0.4289	282.4	136.3	-
19	-17	0503	Dec 19	04:03:22	5644	-18504	P	a-	-0.7784	1.4227	0.4364	282.0	137.0	-
20	-16	0521	Dec 29	12:50:36	5466	-18281	P	a-	-0.7739	1.4296	0.4460	281.8	138.1	-
21	-15	0540	Jan 09	21:34:15	5291	-18058	P	a-	-0.7661	1.4423	0.4620	281.9	140.0	-
22	-14	0558	Jan 20	06:14:47	5116	-17835	P	a-	-0.7554	1.4601	0.4833	282.4	142.5	-
23	-13	0576	Jan 31	14:48:13	4943	-17612	P	a-	-0.7385	1.4893	0.5163	283.5	146.3	-
24	-12	0594	Feb 10	23:16:48	4771	-17389	P	a-	-0.7172	1.5263	0.5573	285.1	150.9	-
25	-11	0612	Feb 22	07:37:09	4601	-17166	P	a-	-0.6888	1.5763	0.6115	287.3	156.5	-

26	-10	0630 Mar 04	15:51:20	4432 -16943	P	a-	-0.6551	1.6361	0.6754	290.0	162.7	-
27	-09	0648 Mar 14	23:56:21	4264 -16720	P	a-	-0.6132	1.7109	0.7541	293.2	169.5	-
28	-08	0666 Mar 26	07:55:36	4098 -16497	P	a-	-0.5664	1.7949	0.8419	296.6	176.4	-
29	-07	0684 Apr 05	15:47:00	3934 -16274	P	a-	-0.5127	1.8918	0.9422	300.2	183.3	-
30	-06	0702 Apr 16	23:32:06	3772 -16051	T	a-	-0.4535	1.9989	1.0523	303.7	189.8	33.6
31	-05	0720 Apr 27	07:11:17	3613 -15828	T	a-	-0.3893	2.1155	1.1714	307.1	195.7	58.7
32	-04	0738 May 08	14:46:04	3455 -15605	T	p-	-0.3214	2.2390	1.2969	310.1	200.9	74.2
33	-03	0756 May 18	22:17:22	3301 -15382	T-	p-	-0.2504	2.3687	1.4279	312.7	205.2	85.1
34	-02	0774 May 30	05:44:59	3149 -15159	T-	p-	-0.1764	2.5041	1.5640	314.8	208.4	92.6
35	-01	0792 Jun 09	13:12:03	3000 -14936	T-	pp	-0.1020	2.6406	1.7005	316.3	210.6	97.3
36	00	0810 Jun 20	20:38:25	2854 -14713	T-	pp	-0.0274	2.7779	1.8371	317.1	211.6	99.4
37	01	0828 Jul 01	04:05:59	2712 -14490	T+	pp	0.0461	2.7441	1.8020	317.3	211.6	99.1
38	02	0846 Jul 12	11:35:24	2574 -14267	T+	-p	0.1179	2.6133	1.6693	317.0	210.5	96.5
39	03	0864 Jul 22	19:08:57	2439 -14044	T+	-p	0.1860	2.4897	1.5431	316.1	208.5	91.8
40	04	0882 Aug 03	02:47:08	2308 -13821	T+	-p	0.2497	2.3744	1.4247	314.9	205.7	85.0
41	05	0900 Aug 13	10:30:10	2182 -13598	T	-p	0.3091	2.2671	1.3139	313.3	202.4	76.1
42	06	0918 Aug 24	18:19:51	2059 -13375	T	-p	0.3626	2.1710	1.2138	311.7	198.7	65.0
43	07	0936 Sep 04	02:16:16	1941 -13152	T	-a	0.4102	2.0859	1.1243	310.0	194.8	51.0
44	08	0954 Sep 15	10:20:13	1828 -12929	T	-a	0.4511	2.0131	1.0471	308.4	190.9	32.1
45	09	0972 Sep 25	18:30:55	1719 -12706	P	-a	0.4860	1.9515	0.9807	307.1	187.3	-
46	10	0990 Oct 07	02:49:28	1614 -12483	P	-a	0.5138	1.9028	0.9274	306.1	184.2	-
47	11	1008 Oct 17	11:14:53	1514 -12260	P	-a	0.5357	1.8649	0.8849	305.5	181.5	-
48	12	1026 Oct 28	19:46:13	1419 -12037	P	-a	0.5522	1.8367	0.8524	305.2	179.5	-
49	13	1044 Nov 08	04:23:18	1328 -11814	P	-a	0.5636	1.8178	0.8295	305.3	178.1	-
50	14	1062 Nov 19	13:04:07	1242 -11591	P	-a	0.5717	1.8048	0.8129	305.6	177.2	-
51	15	1080 Nov 29	21:48:25	1161 -11368	P	-a	0.5763	1.7981	0.8029	306.2	176.7	-
52	16	1098 Dec 11	06:32:29	1084 -11145	P	-a	0.5808	1.7911	0.7932	306.8	176.3	-
53	17	1116 Dec 21	15:17:52	1011 -10922	P	-a	0.5839	1.7867	0.7865	307.5	176.2	-

54	18	1135 Jan 02 00:00:14	943 -10699	P	-a	0.5894	1.7774	0.7755	308.0	175.7	-
55	19	1153 Jan 12 08:39:57	878 -10476	P	-a	0.5965	1.7649	0.7619	308.3	175.0	-
56	20	1171 Jan 23 17:13:11	818 -10253	P	-a	0.6086	1.7431	0.7392	308.1	173.5	-
57	21	1189 Feb 03 01:41:20	761 -10030	P	-a	0.6245	1.7142	0.7098	307.5	171.3	-
58	22	1207 Feb 14 10:01:10	709 -9807	P	-a	0.6469	1.6732	0.6685	306.3	167.9	-
59	23	1225 Feb 24 18:12:46	659 -9584	P	-a	0.6756	1.6207	0.6159	304.3	163.0	-
60	24	1243 Mar 08 02:14:43	613 -9361	P	-a	0.7116	1.5546	0.5498	301.3	156.1	-
61	25	1261 Mar 18 10:07:56	570 -9138	P	-a	0.7540	1.4769	0.4720	297.3	146.9	-
62	26	1279 Mar 29 17:50:49	530 -8915	P	-a	0.8041	1.3850	0.3799	292.0	134.1	-
63	27	1297 Apr 09 01:24:32	492 -8692	P	-a	0.8611	1.2807	0.2751	285.1	116.2	-
64	28	1315 Apr 20 08:49:00	457 -8469	P	-a	0.9245	1.1647	0.1583	276.4	90.0	-
65	29	1333 Apr 30 16:06:09	424 -8246	P	-a	0.9930	1.0397	0.0322	265.7	41.4	-
66	30	1351 May 11 23:14:20	393 -8023	N	-h	1.0676	0.9036	-0.1054	252.2	-	-
67	31	1369 May 22 06:17:43	363 -7800	N	-h	1.1448	0.7628	-0.2483	236.0	-	-
68	32	1387 Jun 02 13:14:54	336 -7577	N	-h	1.2257	0.6157	-0.3979	216.1	-	-
69	33	1405 Jun 12 20:10:11	310 -7354	N	-h	1.3072	0.4678	-0.5489	191.8	-	-
70	34	1423 Jun 24 03:00:25	286 -7131	N	-h	1.3912	0.3153	-0.7050	160.4	-	-
71	35	1441 Jul 04 09:52:12	262 -6908	N	-t	1.4727	0.1679	-0.8565	119.2	-	-
72	36	1459 Jul 15 16:42:43	240 -6685	Ne	-t	1.5537	0.0217	-1.0073	43.6	-	-

SAROS SERIES

Saros series 92 contains 71 lunar eclipses.

PHASE													
DURATIONS													
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-37	0208 May 17	18:36:22	8521 -22160	Nb	a-	1.5180	0.0452	-0.9007	56.8	-	-	
02	-36	0226 May 29	02:00:34	8350 -21937	N	a-	1.4498	0.1708	-0.7760	109.4	-	-	
03	-35	0244 Jun 08	09:23:11	8179 -21714	N	a-	1.3804	0.2989	-0.6495	143.4	-	-	
04	-34	0262 Jun 19	16:45:31	8006 -21491	N	a-	1.3112	0.4270	-0.5236	169.7	-	-	
05	-33	0280 Jun 30	00:08:08	7833 -21268	N	a-	1.2426	0.5544	-0.3991	191.5	-	-	
06	-32	0298 Jul 11	07:33:40	7660 -21045	N	a-	1.1766	0.6772	-0.2798	209.7	-	-	
07	-31	0316 Jul 21	15:02:38	7486 -20822	N	a-	1.1136	0.7949	-0.1662	225.2	-	-	
08	-30	0334 Aug 01	22:35:06	7310 -20599	N	a-	1.0539	0.9067	-0.0589	238.5	-	-	
09	-29	0352 Aug 12	06:13:36	7134 -20376	P	a-	0.9996	1.0090	0.0384	249.8	43.4	-	
10	-28	0370 Aug 23	13:58:02	6957 -20153	P	a-	0.9507	1.1014	0.1254	259.3	77.7	-	
11	-27	0388 Sep 02	21:50:16	6780 -19930	P	a-	0.9085	1.1817	0.2001	267.3	97.3	-	
12	-26	0406 Sep 14	05:48:01	6602 -19707	P	a-	0.8713	1.2527	0.2654	274.1	111.3	-	
13	-25	0424 Sep 24	13:54:44	6423 -19484	P	a-	0.8422	1.3091	0.3160	279.6	120.9	-	
14	-24	0442 Oct 05	22:07:34	6245 -19261	P	a-	0.8187	1.3550	0.3563	284.1	127.9	-	
15	-23	0460 Oct 16	06:27:57	6067 -19038	P	a-	0.8021	1.3882	0.3841	287.6	132.6	-	
16	-22	0478 Oct 27	14:52:48	5889 -18815	P	a-	0.7899	1.4132	0.4039	290.5	135.9	-	
17	-21	0496 Nov 06	23:23:50	5713 -18592	P	a-	0.7834	1.4275	0.4135	292.6	137.7	-	

18	-20	0514	Nov 18	07:57:20	5536	-18369	P	a-	0.7797	1.4365	0.4182	294.4	138.8	-
19	-19	0532	Nov 28	16:33:14	5360	-18146	P	a-	0.7789	1.4398	0.4178	295.7	139.1	-
20	-18	0550	Dec 10	01:09:23	5185	-17923	P	a-	0.7790	1.4413	0.4161	296.9	139.2	-
21	-17	0568	Dec 20	09:45:04	5011	-17700	P	a-	0.7798	1.4411	0.4134	297.9	139.2	-
22	-16	0586	Dec 31	18:16:58	4839	-17477	P	a-	0.7779	1.4455	0.4158	299.2	140.0	-
23	-15	0605	Jan 11	02:44:30	4668	-17254	P	a-	0.7732	1.4548	0.4237	300.9	141.6	-
24	-14	0623	Jan 22	11:05:47	4498	-17031	P	a-	0.7644	1.4716	0.4395	303.0	144.2	-
25	-13	0641	Feb 01	19:20:41	4330	-16808	P	a-	0.7512	1.4961	0.4634	305.6	148.0	-
26	-12	0659	Feb 13	03:25:32	4164	-16585	P	h-	0.7305	1.5342	0.5011	309.1	153.5	-
27	-11	0677	Feb 23	11:22:19	3999	-16362	P	h-	0.7040	1.5829	0.5497	313.1	160.0	-
28	-10	0695	Mar 06	19:08:00	3836	-16139	P	t-	0.6691	1.6471	0.6138	318.0	167.9	-
29	-09	0713	Mar 17	02:45:03	3675	-15916	P	t-	0.6279	1.7226	0.6893	323.2	176.3	-
30	-08	0731	Mar 28	10:09:54	3517	-15693	P	t-	0.5778	1.8146	0.7811	329.0	185.4	-
31	-07	0749	Apr 07	17:26:53	3361	-15470	P	t-	0.5220	1.9173	0.8834	334.8	194.2	-
32	-06	0767	Apr 19	00:33:10	3208	-15247	T	t-	0.4581	2.0348	1.0002	340.8	203.0	2.4
33	-05	0785	Apr 29	07:32:14	3058	-15024	T	t-	0.3891	2.1619	1.1263	346.3	210.9	55.1
34	-04	0803	May 10	14:22:49	2911	-14801	T	pp	0.3139	2.3006	1.2637	351.5	218.0	76.2
35	-03	0821	May 20	21:08:36	2768	-14578	T+	pp	0.2354	2.4455	1.4068	356.0	223.7	90.0
36	-02	0839	Jun 01	03:49:08	2628	-14355	T+	pp	0.1534	2.5971	1.5561	359.7	228.0	99.1
37	-01	0857	Jun 11	10:26:01	2492	-14132	T+	pp	0.0691	2.7531	1.7094	362.4	230.8	104.1
38	00	0875	Jun 22	17:01:48	2359	-13909	T-	pp	-0.0154	2.8533	1.8064	364.1	231.8	105.4
39	01	0893	Jul 02	23:37:17	2231	-13686	T-	pp	-0.0998	2.7003	1.6499	364.7	231.2	103.0
40	02	0911	Jul 14	06:14:57	2107	-13463	T-	pp	-0.1816	2.5522	1.4978	364.4	228.9	96.8
41	03	0929	Jul 24	12:54:35	1987	-13240	T-	pp	-0.2611	2.4085	1.3498	363.1	225.1	86.3
42	04	0947	Aug 04	19:39:58	1872	-13017	T	-t	-0.3354	2.2745	1.2112	361.1	219.9	70.6
43	05	0965	Aug 15	02:30:04	1761	-12794	T	-t	-0.4053	2.1487	1.0806	358.4	213.6	45.6
44	06	0983	Aug 26	09:26:42	1655	-12571	P	-t	-0.4691	2.0340	0.9610	355.3	206.4	-
45	07	1001	Sep 05	16:30:33	1553	-12348	P	-t	-0.5266	1.9311	0.8531	351.9	198.6	-

46	08	1019	Sep 16	23:43:14	1456	-12125	P	-t	-0.5760	1.8429	0.7600	348.7	190.8	-
47	09	1037	Sep 27	07:04:05	1364	-11902	P	-t	-0.6185	1.7672	0.6796	345.6	183.2	-
48	10	1055	Oct 08	14:32:40	1276	-11679	P	-t	-0.6543	1.7038	0.6118	342.8	176.0	-
49	11	1073	Oct 18	22:09:44	1193	-11456	P	-t	-0.6827	1.6537	0.5577	340.4	169.7	-
50	12	1091	Oct 30	05:54:30	1114	-11233	P	-t	-0.7043	1.6159	0.5163	338.6	164.5	-
51	13	1109	Nov 09	13:45:00	1039	-11010	P	-t	-0.7211	1.5865	0.4841	337.2	160.2	-
52	14	1127	Nov 20	21:40:54	969	-10787	P	-t	-0.7332	1.5654	0.4608	336.1	156.9	-
53	15	1145	Dec 01	05:40:07	903	-10564	P	-t	-0.7425	1.5490	0.4429	335.2	154.3	-
54	16	1163	Dec 12	13:42:18	841	-10341	P	-t	-0.7493	1.5368	0.4301	334.5	152.4	-
55	17	1181	Dec 22	21:43:01	783	-10118	P	-t	-0.7570	1.5225	0.4161	333.5	150.3	-
56	18	1200	Jan 03	05:44:10	729	-9895	P	-t	-0.7645	1.5084	0.4030	332.4	148.2	-
57	19	1218	Jan 13	13:40:34	678	-9672	P	-t	-0.7754	1.4875	0.3839	330.6	145.0	-
58	20	1236	Jan 24	21:33:27	631	-9449	P	-t	-0.7894	1.4605	0.3594	328.3	140.8	-
59	21	1254	Feb 04	05:18:13	586	-9226	P	-t	-0.8099	1.4213	0.3232	324.9	134.2	-
60	22	1272	Feb 15	12:57:53	545	-9003	P	-t	-0.8346	1.3742	0.2798	320.6	125.6	-
61	23	1290	Feb 25	20:28:11	506	-8780	P	-t	-0.8665	1.3135	0.2232	315.0	113.0	-
62	24	1308	Mar 08	03:50:42	470	-8557	P	-t	-0.9050	1.2406	0.1548	307.9	95.0	-
63	25	1326	Mar 19	11:03:40	436	-8334	P	-t	-0.9512	1.1535	0.0722	299.0	65.6	-
64	26	1344	Mar 29	18:09:24	405	-8111	Nx	-t	-1.0035	1.0552	-0.0213	288.3	-	-
65	27	1362	Apr 10	01:06:46	375	-7888	N	-t	-1.0626	0.9445	-0.1274	275.2	-	-
66	28	1380	Apr 20	07:57:16	347	-7665	N	-t	-1.1271	0.8236	-0.2435	259.4	-	-
67	29	1398	May 01	14:41:55	320	-7442	N	-t	-1.1967	0.6937	-0.3691	240.5	-	-
68	30	1416	May 11	21:22:21	295	-7219	N	-t	-1.2700	0.5571	-0.5015	217.7	-	-
69	31	1434	May 23	03:58:56	271	-6996	N	-t	-1.3466	0.4146	-0.6401	189.8	-	-
70	32	1452	Jun 02	10:34:09	249	-6773	N	-t	-1.4244	0.2701	-0.7812	154.7	-	-
71	33	1470	Jun 13	17:08:38	228	-6550	N	-t	-1.5032	0.1241	-0.9242	105.9	-	-

SAROS SERIES

93

Saros series 93 contains 71 lunar eclipses.

PHASE													
DURATIONS													
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-34	0291 May 30 16:42:48	7729 -21133	Nb t-	-1.5493	0.0457	-1.0149	65.7	-	-			
02	-33	0309 Jun 09 23:06:16	7554 -20910	N t-	-1.4661	0.1991	-0.8632	135.6	-	-			
03	-32	0327 Jun 21 05:30:30	7380 -20687	N t-	-1.3836	0.3516	-0.7128	178.0	-	-			
04	-31	0345 Jul 01 11:55:58	7204 -20464	N t-	-1.3016	0.5033	-0.5635	210.4	-	-			
05	-30	0363 Jul 12 18:24:05	7027 -20241	N t-	-1.2215	0.6517	-0.4180	236.5	-	-			
06	-29	0381 Jul 23 00:56:52	6850 -20018	N t-	-1.1451	0.7935	-0.2792	257.7	-	-			
07	-28	0399 Aug 03 07:35:32	6672 -19795	N t-	-1.0732	0.9271	-0.1490	275.2	-	-			
08	-27	0417 Aug 13 14:21:02	6494 -19572	Nx t-	-1.0065	1.0513	-0.0283	289.7	-	-			
09	-26	0435 Aug 24 21:14:38	6315 -19349	P t-	-0.9461	1.1639	0.0808	301.6	69.6	-			
10	-25	0453 Sep 04 04:17:10	6137 -19126	P t-	-0.8927	1.2637	0.1770	311.2	101.6	-			

11	-24	0471	Sep 15	11:29:32	5959	-18903	P	t-	-0.8472	1.3489	0.2588	318.8	121.4	-
12	-23	0489	Sep 25	18:49:56	5783	-18680	P	t-	-0.8081	1.4222	0.3290	324.8	135.4	-
13	-22	0507	Oct 07	02:20:32	5606	-18457	P	t-	-0.7769	1.4809	0.3847	329.4	145.1	-
14	-21	0525	Oct 17	09:59:06	5429	-18234	P	t-	-0.7519	1.5280	0.4294	332.8	152.2	-
15	-20	0543	Oct 28	17:46:25	5254	-18011	P	t-	-0.7338	1.5620	0.4616	335.1	156.9	-
16	-19	0561	Nov 08	01:38:42	5080	-17788	P	t-	-0.7195	1.5890	0.4873	336.7	160.4	-
17	-18	0579	Nov 19	09:37:50	4907	-17565	P	t-	-0.7103	1.6061	0.5039	337.6	162.5	-
18	-17	0597	Nov 29	17:39:59	4735	-17342	P	t-	-0.7030	1.6194	0.5175	338.1	164.2	-
19	-16	0615	Dec 11	01:44:34	4565	-17119	P	t-	-0.6971	1.6296	0.5288	338.3	165.5	-
20	-15	0633	Dec 21	09:48:43	4396	-16896	P	t-	-0.6904	1.6410	0.5420	338.4	166.9	-
21	-14	0652	Jan 01	17:51:58	4229	-16673	P	t-	-0.6823	1.6545	0.5582	338.5	168.7	-
22	-13	0670	Jan 12	01:51:41	4064	-16450	P	t-	-0.6708	1.6740	0.5810	338.9	171.3	-
23	-12	0688	Jan 23	09:46:28	3900	-16227	P	t-	-0.6545	1.7018	0.6130	339.6	174.7	-
24	-11	0706	Feb 02	17:35:35	3738	-16004	P	t-	-0.6328	1.7392	0.6550	340.7	179.0	-
25	-10	0724	Feb 14	01:18:04	3579	-15781	P	t-	-0.6051	1.7875	0.7084	342.1	184.1	-
26	-09	0742	Feb 24	08:51:59	3422	-15558	P	t-	-0.5698	1.8496	0.7760	344.1	190.1	-
27	-08	0760	Mar 06	16:18:27	3268	-15335	P	t-	-0.5277	1.9239	0.8560	346.2	196.5	-
28	-07	0778	Mar 17	23:36:51	3117	-15112	P	t-	-0.4782	2.0117	0.9498	348.6	203.0	-
29	-06	0796	Mar 28	06:48:48	2969	-14889	T	t-	-0.4225	2.1110	1.0550	350.9	209.2	37.5
30	-05	0814	Apr 08	13:52:16	2824	-14666	T	t-	-0.3589	2.2246	1.1745	353.0	215.1	64.2
31	-04	0832	Apr 18	20:51:19	2683	-14443	T	t-	-0.2910	2.3464	1.3019	354.6	220.1	80.6
32	-03	0850	Apr 30	03:44:32	2545	-14220	T-	pp	-0.2175	2.4786	1.4394	355.7	224.0	92.1
33	-02	0868	May 10	10:35:28	2411	-13997	T-	pp	-0.1411	2.6163	1.5822	356.1	226.7	99.5
34	-01	0886	May 21	17:22:29	2281	-13774	T-	pp	-0.0603	2.7622	1.7327	355.6	227.9	103.6
35	00	0904	Jun 01	00:10:31	2155	-13551	T+	pp	0.0207	2.8327	1.8073	354.2	227.7	104.2
36	01	0922	Jun 12	06:58:18	2034	-13328	T+	pp	0.1026	2.6807	1.6589	351.9	225.9	101.5
37	02	0940	Jun 22	13:48:38	1917	-13105	T+	pp	0.1834	2.5307	1.5122	348.7	222.6	95.4
38	03	0958	Jul 03	20:42:11	1804	-12882	T+	pp	0.2625	2.3844	1.3684	344.6	217.9	85.5

39	04	0976	Jul 14	03:41:09	1696	-12659	T	-p	0.3379	2.2450	1.2312	339.9	212.0	70.9
40	05	0994	Jul 25	10:46:43	1593	-12436	T	-t	0.4086	2.1143	1.1021	334.7	205.1	49.0
41	06	1012	Aug 04	17:58:16	1494	-12213	P	-t	0.4752	1.9914	0.9806	329.1	197.2	-
42	07	1030	Aug 16	01:18:59	1400	-11990	P	-h	0.5349	1.8815	0.8715	323.4	189.0	-
43	08	1048	Aug 26	08:47:40	1310	-11767	P	-a	0.5886	1.7827	0.7732	317.7	180.5	-
44	09	1066	Sep 06	16:26:32	1225	-11544	P	-a	0.6349	1.6977	0.6885	312.3	172.2	-
45	10	1084	Sep 17	00:14:00	1144	-11321	P	-a	0.6746	1.6246	0.6155	307.3	164.2	-
46	11	1102	Sep 28	08:12:27	1068	-11098	P	-a	0.7063	1.5664	0.5575	302.9	157.3	-
47	12	1120	Oct 08	16:19:42	996	-10875	P	-a	0.7314	1.5204	0.5115	299.1	151.3	-
48	13	1138	Oct 20	00:35:55	929	-10652	P	-a	0.7500	1.4861	0.4775	296.0	146.5	-
49	14	1156	Oct 30	08:59:49	865	-10429	P	-a	0.7631	1.4617	0.4537	293.6	142.9	-
50	15	1174	Nov 10	17:31:32	806	-10206	P	-a	0.7709	1.4471	0.4398	291.7	140.6	-
51	16	1192	Nov 21	02:08:07	750	-9983	P	-a	0.7752	1.4385	0.4325	290.3	139.3	-
52	17	1210	Dec 02	10:48:53	698	-9760	P	-a	0.7770	1.4344	0.4301	289.2	138.6	-
53	18	1228	Dec 12	19:31:51	649	-9537	P	-a	0.7777	1.4319	0.4299	288.1	138.2	-
54	19	1246	Dec 24	04:16:48	604	-9314	P	-a	0.7778	1.4305	0.4311	287.1	138.1	-
55	20	1265	Jan 03	12:59:20	561	-9091	P	-a	0.7803	1.4241	0.4280	285.8	137.3	-
56	21	1283	Jan 14	21:40:31	521	-8868	P	-a	0.7846	1.4145	0.4220	284.3	136.2	-
57	22	1301	Jan 25	06:16:32	484	-8645	P	-a	0.7937	1.3956	0.4072	282.1	133.8	-
58	23	1319	Feb 05	14:49:06	449	-8422	P	-a	0.8062	1.3706	0.3866	279.5	130.5	-
59	24	1337	Feb 15	23:13:25	417	-8199	P	-a	0.8261	1.3317	0.3523	275.9	125.0	-
60	25	1355	Feb 27	07:33:13	386	-7976	P	-a	0.8503	1.2849	0.3103	271.6	117.8	-
61	26	1373	Mar 09	15:44:12	358	-7753	P	-a	0.8822	1.2240	0.2542	266.1	107.3	-
62	27	1391	Mar 20	23:49:01	330	-7530	P	-a	0.9197	1.1528	0.1878	259.6	92.9	-
63	28	1409	Mar 31	07:45:13	305	-7307	P	-a	0.9647	1.0679	0.1074	251.5	71.0	-
64	29	1427	Apr 11	15:36:23	281	-7084	P	-a	1.0144	0.9746	0.0184	242.1	29.7	-
65	30	1445	Apr 21	23:20:33	258	-6861	N	-a	1.0703	0.8700	-0.0823	230.7	-	-
66	31	1463	May 03	06:59:35	236	-6638	N	-a	1.1308	0.7572	-0.1917	217.3	-	-

67	32	1481	May 13	14:33:56	215	-6415	N	-a	1.1952	0.6376	-0.3085	201.5	-	-
68	33	1499	May 24	22:05:32	196	-6192	N	-a	1.2621	0.5136	-0.4301	182.8	-	-
69	34	1517	Jun 04	05:34:12	178	-5969	N	-a	1.3316	0.3854	-0.5567	160.1	-	-
70	35	1535	Jun 15	13:01:28	162	-5746	N	-a	1.4023	0.2550	-0.6860	131.7	-	-
71	36	1553	Jun 25	20:29:09	147	-5523	N	-a	1.4726	0.1258	-0.8148	93.6	-	-

SAROS SERIES

94

Saros series 94 contains 71 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-35	0320	May 09	02:06:07	7449	-20775	N	a-	1.4856	0.1345	-0.8706	104.5	-	-
02	-34	0338	May 20	09:07:53	7273	-20552	N	a-	1.4078	0.2749	-0.7256	146.8	-	-
03	-33	0356	May 30	16:07:42	7097	-20329	N	a-	1.3268	0.4216	-0.5748	178.5	-	-
04	-32	0374	Jun 10	23:10:19	6920	-20106	N	a-	1.2468	0.5666	-0.4262	203.2	-	-

05	-31	0392	Jun 21	06:13:49	6742	-19883	N	a-	1.1661	0.7131	-0.2768	223.7	-	-
06	-30	0410	Jul 02	13:23:17	6564	-19660	N	a-	1.0890	0.8533	-0.1342	240.3	-	-
07	-29	0428	Jul 12	20:36:32	6386	-19437	P	a-	1.0138	0.9904	0.0047	254.3	15.7	-
08	-28	0446	Jul 24	03:56:14	6207	-19214	P	a-	0.9428	1.1200	0.1357	265.7	82.0	-
09	-27	0464	Aug 03	11:22:45	6029	-18991	P	a-	0.8765	1.2413	0.2578	275.1	110.7	-
10	-26	0482	Aug 14	18:57:45	5852	-18768	P	a-	0.8163	1.3516	0.3684	282.6	129.8	-
11	-25	0500	Aug 25	02:41:11	5676	-18545	P	a-	0.7623	1.4506	0.4675	288.5	143.6	-
12	-24	0518	Sep 05	10:33:20	5499	-18322	P	a-	0.7150	1.5376	0.5543	293.2	153.9	-
13	-23	0536	Sep 15	18:35:11	5323	-18099	P	a-	0.6749	1.6114	0.6277	296.7	161.4	-
14	-22	0554	Sep 27	02:46:01	5148	-17876	P	a-	0.6416	1.6726	0.6884	299.3	166.9	-
15	-21	0572	Oct 07	11:05:09	4975	-17653	P	a-	0.6148	1.7220	0.7374	301.1	170.9	-
16	-20	0590	Oct 18	19:32:46	4803	-17430	P	a-	0.5946	1.7592	0.7743	302.2	173.7	-
17	-19	0608	Oct 29	04:07:37	4632	-17207	P	a-	0.5800	1.7862	0.8012	302.9	175.5	-
18	-18	0626	Nov 09	12:48:58	4463	-16984	P	a-	0.5703	1.8038	0.8191	303.0	176.6	-
19	-17	0644	Nov 19	21:34:01	4295	-16761	P	a-	0.5632	1.8166	0.8325	303.0	177.2	-
20	-16	0662	Dec 01	06:23:27	4129	-16538	P	a-	0.5595	1.8228	0.8398	302.7	177.5	-
21	-15	0680	Dec 11	15:14:04	3964	-16315	P	a-	0.5568	1.8270	0.8455	302.2	177.7	-
22	-14	0698	Dec 23	00:04:48	3802	-16092	P	a-	0.5537	1.8316	0.8521	301.8	177.9	-
23	-13	0717	Jan 02	08:52:59	3642	-15869	P	a-	0.5484	1.8402	0.8630	301.6	178.5	-
24	-12	0735	Jan 13	17:38:29	3484	-15646	P	a-	0.5408	1.8526	0.8783	301.5	179.4	-
25	-11	0753	Jan 24	02:19:22	3329	-15423	P	a-	0.5294	1.8721	0.9009	301.8	180.8	-
26	-10	0771	Feb 04	10:53:52	3176	-15200	P	a-	0.5127	1.9010	0.9332	302.4	182.8	-
27	-09	0789	Feb 14	19:22:01	3027	-14977	P	a-	0.4906	1.9396	0.9754	303.3	185.3	-
28	-08	0807	Feb 26	03:42:39	2881	-14754	T	a-	0.4621	1.9901	1.0295	304.7	188.5	25.4
29	-07	0825	Mar 08	11:55:53	2738	-14531	T	a-	0.4275	2.0519	1.0949	306.3	191.9	44.7
30	-06	0843	Mar 19	20:00:50	2599	-14308	T	p-	0.3858	2.1265	1.1730	308.2	195.7	58.9
31	-05	0861	Mar 30	03:58:57	2463	-14085	T	p-	0.3383	2.2122	1.2617	310.1	199.4	70.4
32	-04	0879	Apr 10	11:50:07	2332	-13862	T	p-	0.2849	2.3088	1.3612	312.1	203.0	79.9

33	-03	0897	Apr 20	19:34:20	2205	-13639	T+	p-	0.2254	2.4168	1.4716	313.9	206.2	87.7
34	-02	0915	May 02	03:13:23	2081	-13416	T+	p-	0.1613	2.5334	1.5900	315.5	208.8	93.6
35	-01	0933	May 12	10:47:29	1963	-13193	T+	pp	0.0929	2.6583	1.7161	316.6	210.7	97.6
36	00	0951	May 23	18:18:29	1848	-12970	T+	pp	0.0221	2.7879	1.8464	317.2	211.6	99.4
37	01	0969	Jun 03	01:45:37	1738	-12747	T-	pp	-0.0520	2.7330	1.7915	317.3	211.6	99.0
38	02	0987	Jun 14	09:12:40	1633	-12524	T-	-p	-0.1261	2.5975	1.6553	316.7	210.4	96.2
39	03	1005	Jun 24	16:38:42	1532	-12301	T-	-p	-0.2011	2.4605	1.5170	315.5	208.1	90.6
40	04	1023	Jul 06	00:06:25	1436	-12078	T	-p	-0.2742	2.3274	1.3820	313.7	204.6	82.0
41	05	1041	Jul 16	07:35:26	1345	-11855	T	-p	-0.3458	2.1972	1.2491	311.4	200.1	69.4
42	06	1059	Jul 27	15:08:45	1258	-11632	T	-a	-0.4135	2.0746	1.1234	308.5	194.7	50.9
43	07	1077	Aug 06	22:46:01	1176	-11409	T	-a	-0.4775	1.9590	1.0041	305.4	188.4	9.6
44	08	1095	Aug 18	06:28:04	1098	-11186	P	-a	-0.5372	1.8516	0.8925	302.0	181.5	-
45	09	1113	Aug 28	14:16:50	1024	-10963	P	-a	-0.5908	1.7555	0.7919	298.6	174.2	-
46	10	1131	Sep 08	22:12:05	955	-10740	P	-a	-0.6385	1.6704	0.7020	295.3	166.8	-
47	11	1149	Sep 19	06:15:22	890	-10517	P	-a	-0.6793	1.5981	0.6247	292.4	159.6	-
48	12	1167	Sep 30	14:24:46	829	-10294	P	-a	-0.7146	1.5358	0.5574	289.8	152.7	-
49	13	1185	Oct 10	22:42:44	772	-10071	P	-a	-0.7424	1.4873	0.5038	287.8	146.7	-
50	14	1203	Oct 22	07:06:23	718	-9848	P	-a	-0.7653	1.4479	0.4595	286.3	141.3	-
51	15	1221	Nov 01	15:36:50	668	-9625	P	-a	-0.7819	1.4196	0.4266	285.4	137.2	-
52	16	1239	Nov 13	00:11:32	621	-9402	P	-a	-0.7947	1.3983	0.4010	284.9	133.8	-
53	17	1257	Nov 23	08:51:11	578	-9179	P	-a	-0.8029	1.3853	0.3842	284.9	131.6	-
54	18	1275	Dec 04	17:32:19	537	-8956	P	-a	-0.8093	1.3752	0.3707	285.2	129.8	-
55	19	1293	Dec 15	02:14:39	499	-8733	P	-a	-0.8142	1.3676	0.3602	285.5	128.5	-
56	20	1311	Dec 26	10:55:55	463	-8510	P	-a	-0.8194	1.3594	0.3496	285.9	127.1	-
57	21	1330	Jan 05	19:35:32	430	-8287	P	-a	-0.8250	1.3500	0.3383	286.1	125.6	-
58	22	1348	Jan 17	04:09:50	398	-8064	P	-a	-0.8346	1.3330	0.3200	285.7	122.8	-
59	23	1366	Jan 27	12:39:18	369	-7841	P	-a	-0.8476	1.3097	0.2958	284.8	118.8	-
60	24	1384	Feb 07	21:01:03	341	-7618	P	-a	-0.8661	1.2760	0.2615	283.1	112.6	-

61	25	1402	Feb 18	05:16:30	315	-7395	P	-a	-0.8892	1.2339	0.2190	280.5	104.0	-
62	26	1420	Feb 29	13:20:56	290	-7172	P	-a	-0.9205	1.1765	0.1614	276.6	90.3	-
63	27	1438	Mar 11	21:17:55	267	-6949	P	-a	-0.9572	1.1092	0.0939	271.4	69.8	-
64	28	1456	Mar 22	05:03:32	244	-6726	P	-a	-1.0027	1.0258	0.0103	264.2	23.5	-
65	29	1474	Apr 02	12:41:25	223	-6503	N	-a	-1.0536	0.9326	-0.0831	255.2	-	-
66	30	1492	Apr 12	20:07:44	204	-6280	N	-a	-1.1130	0.8239	-0.1924	243.4	-	-
67	31	1510	Apr 24	03:27:17	185	-6057	N	-h	-1.1769	0.7070	-0.3100	229.0	-	-
68	32	1528	May 04	10:37:14	168	-5834	N	-h	-1.2477	0.5778	-0.4406	210.4	-	-
69	33	1546	May 15	17:40:52	153	-5611	N	-h	-1.3223	0.4416	-0.5783	187.1	-	-
70	34	1564	May 26	00:37:06	139	-5388	N	-h	-1.4018	0.2969	-0.7252	156.1	-	-
71	35	1582	Jun 06	07:29:32	128	-5165	N	-t	-1.4830	0.1491	-0.8754	112.5	-	-

SAROS SERIES

95

Saros series 95 contains 71 lunar eclipses.

PHASE													
DURATIONS													
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m

GREATEST

ECLIPSE

01	-37	0349	Apr 19	15:55:44	7167	-20417	N	a-	-1.4957	0.0884	-0.8620	79.3	-	-
02	-36	0367	Apr 30	23:29:00	6990	-20194	N	a-	-1.4341	0.2013	-0.7488	118.6	-	-
03	-35	0385	May 11	06:58:30	6812	-19971	N	a-	-1.3696	0.3199	-0.6305	148.1	-	-
04	-34	0403	May 22	14:22:19	6634	-19748	N	a-	-1.3008	0.4464	-0.5048	173.3	-	-
05	-33	0421	Jun 01	21:45:05	6456	-19525	N	a-	-1.2316	0.5743	-0.3785	194.6	-	-
06	-32	0439	Jun 13	05:05:00	6278	-19302	N	a-	-1.1607	0.7055	-0.2495	213.4	-	-
07	-31	0457	Jun 23	12:26:22	6100	-19079	N	a-	-1.0911	0.8345	-0.1233	229.8	-	-
08	-30	0475	Jul 04	19:46:13	5922	-18856	P	a-	-1.0210	0.9650	0.0037	244.5	13.5	-
09	-29	0493	Jul 15	03:10:25	5746	-18633	P	a-	-0.9550	1.0881	0.1227	257.1	76.8	-
10	-28	0511	Jul 26	10:36:11	5569	-18410	P	a-	-0.8912	1.2075	0.2376	268.3	105.3	-
11	-27	0529	Aug 05	18:07:29	5392	-18187	P	a-	-0.8326	1.3176	0.3426	277.9	124.9	-
12	-26	0547	Aug 17	01:42:51	5217	-17964	P	a-	-0.7779	1.4206	0.4402	286.3	139.9	-
13	-25	0565	Aug 27	09:25:59	5043	-17741	P	a-	-0.7303	1.5109	0.5248	293.4	151.2	-
14	-24	0583	Sep 07	17:15:19	4871	-17518	P	a-	-0.6887	1.5903	0.5982	299.4	160.0	-
15	-23	0601	Sep 18	01:11:32	4699	-17295	P	a-	-0.6534	1.6581	0.6600	304.5	166.8	-
16	-22	0619	Sep 29	09:15:02	4529	-17072	P	a-	-0.6248	1.7136	0.7094	308.8	172.0	-
17	-21	0637	Oct 09	17:26:00	4361	-16849	P	a-	-0.6029	1.7568	0.7468	312.4	175.9	-
18	-20	0655	Oct 21	01:43:16	4194	-16626	P	a-	-0.5868	1.7890	0.7734	315.3	178.6	-
19	-19	0673	Oct 31	10:06:07	4029	-16403	P	a-	-0.5760	1.8116	0.7908	317.7	180.6	-
20	-18	0691	Nov 11	18:33:40	3866	-16180	P	a-	-0.5697	1.8255	0.7998	319.7	181.8	-
21	-17	0709	Nov 22	03:04:52	3705	-15957	P	a-	-0.5670	1.8328	0.8028	321.3	182.6	-
22	-16	0727	Dec 03	11:36:54	3546	-15734	P	a-	-0.5657	1.8369	0.8033	322.8	183.1	-
23	-15	0745	Dec 13	20:09:45	3390	-15511	P	a-	-0.5656	1.8386	0.8019	324.0	183.5	-
24	-14	0763	Dec 25	04:40:18	3236	-15288	P	a-	-0.5643	1.8423	0.8030	325.4	184.1	-
25	-13	0782	Jan 04	13:07:50	3086	-15065	P	a-	-0.5613	1.8487	0.8076	326.8	185.0	-

26	-12	0800	Jan 15	21:29:08	2938	-14842	P	a-	-0.5539	1.8630	0.8205	328.6	186.6	-
27	-11	0818	Jan 26	05:45:02	2794	-14619	P	a-	-0.5428	1.8839	0.8405	330.6	188.8	-
28	-10	0836	Feb 06	13:52:42	2653	-14396	P	h-	-0.5253	1.9161	0.8722	333.1	191.8	-
29	-09	0854	Feb 16	21:51:13	2516	-14173	P	t-	-0.5012	1.9604	0.9164	336.0	195.6	-
30	-08	0872	Feb 28	05:40:08	2383	-13950	P	t-	-0.4700	2.0177	0.9736	339.3	200.2	-
31	-07	0890	Mar 10	13:19:07	2254	-13727	T	t-	-0.4313	2.0887	1.0447	343.0	205.2	33.4
32	-06	0908	Mar 20	20:48:35	2130	-13504	T	p-	-0.3853	2.1730	1.1291	346.8	210.5	55.5
33	-05	0926	Apr 01	04:06:53	2009	-13281	T	p-	-0.3309	2.2730	1.2291	350.8	215.9	71.7
34	-04	0944	Apr 11	11:16:37	1893	-13058	T-	pp	-0.2701	2.3847	1.3406	354.6	221.0	84.2
35	-03	0962	Apr 22	18:16:53	1781	-12835	T-	pp	-0.2025	2.5089	1.4644	358.0	225.4	93.9
36	-02	0980	May 03	01:09:21	1674	-12612	T-	pp	-0.1291	2.6438	1.5985	360.9	228.8	100.7
37	-01	0998	May 14	07:54:10	1571	-12389	T-	pp	-0.0501	2.7894	1.7430	363.1	231.1	104.7
38	00	1016	May 24	14:34:02	1474	-12166	T+	pp	0.0320	2.8235	1.7755	364.4	231.8	105.2
39	01	1034	Jun 04	21:09:34	1380	-11943	T+	pp	0.1168	2.6688	1.6189	364.6	230.9	102.1
40	02	1052	Jun 15	03:41:44	1292	-11720	T+	pp	0.2035	2.5110	1.4587	363.7	228.1	94.6
41	03	1070	Jun 26	10:13:14	1207	-11497	T	-t	0.2897	2.3541	1.2990	361.7	223.4	81.4
42	04	1088	Jul 06	16:45:07	1128	-11274	T	-t	0.3746	2.2000	1.1416	358.5	216.7	59.2
43	05	1106	Jul 17	23:19:32	1053	-11051	P	-t	0.4570	2.0506	0.9887	354.3	208.1	-
44	06	1124	Jul 28	05:56:15	982	-10828	P	-t	0.5367	1.9064	0.8406	349.2	197.5	-
45	07	1142	Aug 08	12:39:04	915	-10605	P	-t	0.6106	1.7729	0.7029	343.5	185.2	-
46	08	1160	Aug 18	19:27:29	852	-10382	P	-t	0.6791	1.6493	0.5749	337.2	171.4	-
47	09	1178	Aug 30	02:23:05	794	-10159	P	-t	0.7413	1.5374	0.4587	330.7	156.1	-
48	10	1196	Sep 09	09:26:43	739	-9936	P	-t	0.7966	1.4383	0.3550	324.3	139.7	-
49	11	1214	Sep 20	16:39:22	687	-9713	P	-t	0.8443	1.3529	0.2654	318.3	122.6	-
50	12	1232	Oct 01	00:01:20	639	-9490	P	-t	0.8838	1.2824	0.1907	312.9	105.1	-
51	13	1250	Oct 12	07:30:04	594	-9267	P	-t	0.9176	1.2223	0.1269	308.0	86.6	-
52	14	1268	Oct 22	15:08:29	552	-9044	P	-t	0.9433	1.1769	0.0781	304.1	68.4	-
53	15	1286	Nov 02	22:53:19	513	-8821	P	-t	0.9638	1.1407	0.0391	300.8	48.7	-

54	16	1304	Nov 13	06:45:34	477	-8598	P	-t	0.9780	1.1157	0.0118	298.5	26.9	-
55	17	1322	Nov 24	14:41:01	442	-8375	Nx	-t	0.9897	1.0951	-0.0102	296.5	-	-
56	18	1340	Dec 04	22:41:46	410	-8152	Nx	-t	0.9970	1.0820	-0.0240	295.1	-	-
57	19	1358	Dec 16	06:43:08	380	-7929	Nx	-t	1.0039	1.0693	-0.0367	293.6	-	-
58	20	1376	Dec 26	14:45:06	352	-7706	Nx	-t	1.0104	1.0569	-0.0482	292.1	-	-
59	21	1395	Jan 06	22:44:41	325	-7483	Nx	-t	1.0191	1.0401	-0.0633	290.0	-	-
60	22	1413	Jan 17	06:41:56	300	-7260	Nx	-t	1.0298	1.0192	-0.0818	287.3	-	-
61	23	1431	Jan 28	14:33:23	276	-7037	N	-t	1.0455	0.9890	-0.1089	283.4	-	-
62	24	1449	Feb 07	22:19:16	253	-6814	N	-t	1.0658	0.9497	-0.1445	278.3	-	-
63	25	1467	Feb 19	05:57:51	232	-6591	N	-t	1.0924	0.8988	-0.1911	271.5	-	-
64	26	1485	Mar 01	13:29:44	211	-6368	N	-t	1.1247	0.8371	-0.2481	263.1	-	-
65	27	1503	Mar 12	20:51:38	192	-6145	N	-t	1.1652	0.7603	-0.3200	251.9	-	-
66	28	1521	Mar 23	04:07:01	175	-5922	N	-t	1.2110	0.6737	-0.4015	238.5	-	-
67	29	1539	Apr 03	11:13:11	159	-5699	N	-t	1.2644	0.5732	-0.4968	221.4	-	-
68	30	1557	Apr 13	18:14:10	144	-5476	N	-t	1.3222	0.4644	-0.6004	200.7	-	-
69	31	1575	Apr 25	01:06:06	132	-5253	N	-t	1.3873	0.3425	-0.7173	173.8	-	-
70	32	1593	May 15	07:55:13	122	-5030	N	-t	1.4548	0.2162	-0.8388	139.2	-	-
71	33	1611	May 26	14:38:02	106	-4807	Ne	-t	1.5270	0.0816	-0.9690	86.2	-	-

SAROS SERIES

Saros series 96 contains 71 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-33	0432 May 01 14:00:49	6348 -19390	Nb t-	1.5387	0.0671 -0.9973	79.6	-	-					
02	-32	0450 May 12 20:31:53	6170 -19167	N t-	1.4616	0.2085 -0.8559	138.7	-	-					
03	-31	0468 May 23 02:58:54	5992 -18944	N t-	1.3810	0.3565 -0.7083	179.3	-	-					
04	-30	0486 Jun 03 09:21:48	5815 -18721	N t-	1.2971	0.5110 -0.5546	211.9	-	-					
05	-29	0504 Jun 13 15:44:17	5639 -18498	N t-	1.2125	0.6668 -0.3999	238.7	-	-					
06	-28	0522 Jun 24 22:06:12	5462 -18275	N t-	1.1271	0.8243 -0.2440	261.6	-	-					
07	-27	0540 Jul 05 04:31:16	5286 -18052	N t-	1.0439	0.9779 -0.0922	280.8	-	-					
08	-26	0558 Jul 16 10:57:54	5112 -17829	P t-	0.9616	1.1301 0.0577	297.4	59.0	-					
09	-25	0576 Jul 26 17:31:30	4939 -17606	P t-	0.8844	1.2729 0.1980	311.0	107.1	-					
10	-24	0594 Aug 07 00:10:03	4767 -17383	P t-	0.8107	1.4095 0.3318	322.5	135.9	-					
11	-23	0612 Aug 17 06:57:52	4596 -17160	P t-	0.7443	1.5328 0.4524	331.8	155.8	-					
12	-22	0630 Aug 28 13:52:42	4427 -16937	P t-	0.6831	1.6466 0.5631	339.5	170.7	-					
13	-21	0648 Sep 07 20:58:42	4260 -16714	P t-	0.6304	1.7447 0.6583	345.4	181.6	-					
14	-20	0666 Sep 19 04:13:04	4094 -16491	P t-	0.5841	1.8311 0.7419	350.1	189.9	-					
15	-19	0684 Sep 29 11:37:19	3930 -16268	P t-	0.5455	1.9032 0.8115	353.7	196.0	-					
16	-18	0702 Oct 10 19:10:42	3768 -16045	P t-	0.5139	1.9623 0.8684	356.3	200.5	-					
17	-17	0720 Oct 21 02:53:28	3608 -15822	P t-	0.4900	2.0071 0.9114	358.0	203.6	-					
18	-16	0738 Nov 01 10:43:51	3451 -15599	P t-	0.4715	2.0416 0.9447	359.2	205.8	-					
19	-15	0756 Nov 11 18:40:07	3296 -15376	P t-	0.4577	2.0673 0.9699	359.8	207.2	-					
20	-14	0774 Nov 23 02:42:09	3145 -15153	P t-	0.4481	2.0848 0.9875	359.9	208.1	-					

21	-13	0792	Dec 03	10:47:42	2996	-14930	T	t-	0.4413	2.0967	1.0004	359.7	208.7	3.1
22	-12	0810	Dec 14	18:54:29	2850	-14707	T	t-	0.4350	2.1075	1.0128	359.4	209.1	18.5
23	-11	0828	Dec 25	03:01:14	2708	-14484	T	t-	0.4284	2.1184	1.0261	358.9	209.6	26.2
24	-10	0847	Jan 05	11:06:14	2570	-14261	T	t-	0.4197	2.1327	1.0437	358.4	210.3	33.7
25	-09	0865	Jan 15	19:08:25	2435	-14038	T	t-	0.4083	2.1517	1.0667	358.0	211.3	41.3
26	-08	0883	Jan 27	03:04:51	2305	-13815	T	t-	0.3916	2.1800	1.0995	357.7	212.8	49.8
27	-07	0901	Feb 06	10:56:34	2178	-13592	T	t-	0.3704	2.2164	1.1410	357.5	214.5	58.4
28	-06	0919	Feb 17	18:40:56	2056	-13369	T	t-	0.3425	2.2647	1.1949	357.5	216.7	67.4
29	-05	0937	Feb 28	02:18:08	1938	-13146	T	p-	0.3079	2.3251	1.2612	357.6	219.2	76.1
30	-04	0955	Mar 11	09:47:24	1825	-12923	T+	p-	0.2660	2.3990	1.3412	357.8	221.7	84.3
31	-03	0973	Mar 21	17:09:47	1716	-12700	T+	p-	0.2176	2.4846	1.4330	357.8	224.1	91.5
32	-02	0991	Apr 02	00:25:28	1611	-12477	T+	pp	0.1630	2.5819	1.5363	357.6	226.0	97.4
33	-01	1009	Apr 12	07:33:32	1512	-12254	T+	pp	0.1011	2.6924	1.6529	357.1	227.4	101.7
34	00	1027	Apr 23	14:37:01	1417	-12031	T+	pp	0.0345	2.8117	1.7780	356.0	227.9	103.9
35	01	1045	May 03	21:35:07	1326	-11808	T-	pp	-0.0376	2.8033	1.7750	354.2	227.3	103.8
36	02	1063	May 15	04:31:01	1240	-11585	T-	pp	-0.1122	2.6637	1.6405	351.6	225.5	100.9
37	03	1081	May 25	11:23:33	1159	-11362	T-	pp	-0.1905	2.5177	1.4992	348.2	222.2	94.7
38	04	1099	Jun 05	18:17:13	1082	-11139	T-	pp	-0.2690	2.3716	1.3572	344.0	217.4	84.5
39	05	1117	Jun 16	01:10:59	1009	-10916	T	-p	-0.3485	2.2239	1.2133	338.8	211.1	68.5
40	06	1135	Jun 27	08:07:45	941	-10693	T	-t	-0.4264	2.0793	1.0717	332.9	203.3	41.4
41	07	1153	Jul 07	15:07:34	877	-10470	P	-t	-0.5027	1.9381	0.9331	326.2	194.0	-
42	08	1171	Jul 18	22:13:16	816	-10247	P	-t	-0.5751	1.8042	0.8013	319.0	183.3	-
43	09	1189	Jul 29	05:24:59	760	-10024	P	-h	-0.6435	1.6779	0.6766	311.3	171.5	-
44	10	1207	Aug 09	12:43:42	707	-9801	P	-h	-0.7071	1.5606	0.5604	303.5	158.5	-
45	11	1225	Aug 19	20:10:52	658	-9578	P	-a	-0.7646	1.4547	0.4552	295.7	144.7	-
46	12	1243	Aug 31	03:46:51	612	-9355	P	-a	-0.8158	1.3606	0.3616	288.1	130.4	-
47	13	1261	Sep 10	11:32:15	569	-9132	P	-a	-0.8598	1.2796	0.2808	281.1	115.9	-

48	14	1279	Sep 21	19:26:50	528	-8909	P	-a	-0.8971	1.2112	0.2123	274.7	101.5	-
49	15	1297	Oct 02	03:30:53	491	-8686	P	-a	-0.9276	1.1553	0.1565	269.2	87.6	-
50	16	1315	Oct 13	11:44:11	456	-8463	P	-a	-0.9511	1.1121	0.1132	264.6	74.7	-
51	17	1333	Oct 23	20:04:51	423	-8240	P	-a	-0.9693	1.0787	0.0800	260.8	62.9	-
52	18	1351	Nov 04	04:34:08	392	-8017	P	-a	-0.9811	1.0568	0.0584	258.1	53.8	-
53	19	1369	Nov 14	13:09:02	363	-7794	P	-a	-0.9887	1.0426	0.0449	256.0	47.1	-
54	20	1387	Nov 25	21:50:13	335	-7571	P	-a	-0.9921	1.0358	0.0392	254.7	44.0	-
55	21	1405	Dec 06	06:33:13	309	-7348	P	-a	-0.9946	1.0304	0.0353	253.5	41.7	-
56	22	1423	Dec 17	15:20:01	285	-7125	P	-a	-0.9947	1.0293	0.0362	252.7	42.1	-
57	23	1441	Dec 28	00:06:08	262	-6902	P	-a	-0.9956	1.0263	0.0358	251.8	41.8	-
58	24	1460	Jan 08	08:51:51	240	-6679	P	-a	-0.9976	1.0211	0.0335	250.6	40.3	-
59	25	1478	Jan 18	17:33:33	219	-6456	P	-a	-1.0033	1.0090	0.0249	248.8	34.7	-
60	26	1496	Jan 30	02:12:22	200	-6233	P	-a	-1.0120	0.9911	0.0107	246.4	22.8	-
61	27	1514	Feb 09	10:45:15	182	-6010	N	-a	-1.0259	0.9636	-0.0127	243.0	-	-
62	28	1532	Feb 20	19:11:57	165	-5787	N	-a	-1.0452	0.9260	-0.0461	238.5	-	-
63	29	1550	Mar 03	03:31:35	150	-5564	N	-a	-1.0707	0.8771	-0.0907	232.7	-	-
64	30	1568	Mar 13	11:44:28	136	-5341	N	-a	-1.1021	0.8171	-0.1462	225.5	-	-
65	31	1586	Apr 03	19:49:08	125	-5118	N	-a	-1.1405	0.7445	-0.2146	216.4	-	-
66	32	1604	Apr 14	03:47:06	114	-4895	N	-a	-1.1848	0.6613	-0.2938	205.2	-	-
67	33	1622	Apr 25	11:37:48	91	-4672	N	-a	-1.2352	0.5669	-0.3845	191.4	-	-
68	34	1640	May 05	19:23:35	63	-4449	N	-a	-1.2899	0.4649	-0.4833	174.8	-	-
69	35	1658	May 17	03:01:54	37	-4226	N	-a	-1.3510	0.3513	-0.5941	153.4	-	-
70	36	1676	May 27	10:37:28	17	-4003	N	-a	-1.4146	0.2337	-0.7095	126.3	-	-
71	37	1694	Jun 07	18:08:12	8	-3780	N	-a	-1.4823	0.1085	-0.8331	87.0	-	-

SAROS SERIES

97

Saros series 97 contains 72 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-36	0443 Mar 31	15:53:13	6240 -19255	N	a-	-1.5144	0.0871	-0.9287	84.8	-	-		
02	-35	0461 Apr 10	23:11:45	6062 -19032	N	a-	-1.4503	0.2016	-0.8081	127.1	-	-		
03	-34	0479 Apr 22	06:26:26	5885 -18809	N	a-	-1.3821	0.3238	-0.6800	158.5	-	-		
04	-33	0497 May 02	13:36:41	5709 -18586	N	a-	-1.3090	0.4552	-0.5432	184.8	-	-		
05	-32	0515 May 13	20:43:57	5531 -18363	N	a-	-1.2324	0.5933	-0.4001	207.2	-	-		
06	-31	0533 May 24	03:49:59	5355 -18140	N	a-	-1.1538	0.7354	-0.2537	226.5	-	-		
07	-30	0551 Jun 04	10:56:21	5180 -17917	N	a-	-1.0744	0.8790	-0.1062	242.9	-	-		
08	-29	0569 Jun 14	18:03:30	5007 -17694	P	a-	-0.9946	1.0238	0.0418	257.2	46.2	-		
09	-28	0587 Jun 26	01:13:11	4834 -17471	P	a-	-0.9157	1.1672	0.1879	269.3	95.7	-		
10	-27	0605 Jul 06	08:27:08	4663 -17248	P	a-	-0.8393	1.3064	0.3292	279.4	123.7	-		
11	-26	0623 Jul 17	15:46:39	4494 -17025	P	a-	-0.7668	1.4387	0.4630	287.8	143.3	-		
12	-25	0641 Jul 27	23:11:29	4326 -16802	P	a-	-0.6977	1.5649	0.5901	294.7	158.2	-		
13	-24	0659 Aug 08	06:44:20	4159 -16579	P	a-	-0.6346	1.6806	0.7063	300.2	169.3	-		

14	-23	0677	Aug 18	14:24:52	3994	-16356	P	a-	-0.5771	1.7861	0.8119	304.5	177.9	-
15	-22	0695	Aug 29	22:14:46	3832	-16133	P	a-	-0.5268	1.8785	0.9040	307.8	184.3	-
16	-21	0713	Sep 09	06:12:00	3671	-15910	P	a-	-0.4820	1.9610	0.9859	310.4	189.1	-
17	-20	0731	Sep 20	14:19:20	3513	-15687	T	a-	-0.4453	2.0286	1.0528	312.1	192.6	34.2
18	-19	0749	Sep 30	22:34:35	3357	-15464	T	a-	-0.4148	2.0851	1.1085	313.4	195.2	48.1
19	-18	0767	Oct 12	06:58:38	3204	-15241	T	a-	-0.3912	2.1288	1.1514	314.2	196.9	55.9
20	-17	0785	Oct 22	15:29:49	3054	-15018	T	p-	-0.3732	2.1621	1.1841	314.6	198.0	60.9
21	-16	0803	Nov 03	00:08:20	2907	-14795	T	p-	-0.3608	2.1850	1.2066	314.7	198.6	63.9
22	-15	0821	Nov 13	08:52:22	2764	-14572	T	p-	-0.3529	2.1995	1.2211	314.6	198.9	65.7
23	-14	0839	Nov 24	17:39:54	2624	-14349	T	p-	-0.3476	2.2092	1.2311	314.4	199.1	66.9
24	-13	0857	Dec 05	02:30:48	2488	-14126	T	p-	-0.3447	2.2140	1.2367	314.0	199.0	67.5
25	-12	0875	Dec 16	11:22:45	2356	-13903	T	p-	-0.3421	2.2182	1.2420	313.7	199.0	68.0
26	-11	0893	Dec 26	20:14:13	2228	-13680	T	p-	-0.3391	2.2230	1.2484	313.3	199.1	68.7
27	-10	0912	Jan 07	05:02:56	2104	-13457	T	p-	-0.3334	2.2324	1.2599	313.1	199.4	70.0
28	-09	0930	Jan 17	13:48:41	1984	-13234	T	p-	-0.3250	2.2465	1.2764	313.0	199.9	71.8
29	-08	0948	Jan 28	22:29:43	1869	-13011	T	p-	-0.3123	2.2684	1.3011	313.1	200.8	74.3
30	-07	0966	Feb 08	07:04:04	1758	-12788	T	p-	-0.2940	2.3006	1.3362	313.4	202.0	77.5
31	-06	0984	Feb 19	15:31:52	1652	-12565	T-	p-	-0.2700	2.3430	1.3817	313.9	203.4	81.3
32	-05	1002	Mar 01	23:51:54	1550	-12342	T-	p-	-0.2396	2.3972	1.4390	314.6	205.1	85.4
33	-04	1020	Mar 12	08:04:38	1454	-12119	T-	p-	-0.2030	2.4628	1.5077	315.4	206.8	89.5
34	-03	1038	Mar 23	16:08:34	1361	-11896	T-	p-	-0.1590	2.5422	1.5899	316.2	208.6	93.3
35	-02	1056	Apr 03	00:05:48	1273	-11673	T-	p-	-0.1093	2.6320	1.6822	317.0	210.0	96.5
36	-01	1074	Apr 14	07:55:33	1190	-11450	T-	pp	-0.0536	2.7331	1.7855	317.5	211.1	98.6
37	00	1092	Apr 24	15:38:18	1112	-11227	T+	pp	0.0080	2.8160	1.8702	317.7	211.6	99.3
38	01	1110	May 05	23:15:37	1037	-11004	T+	pp	0.0740	2.6943	1.7496	317.5	211.2	98.3
39	02	1128	May 16	06:48:04	967	-10781	T+	-p	0.1439	2.5658	1.6217	316.7	209.9	95.0
40	03	1146	May 27	14:17:43	902	-10558	T+	-p	0.2160	2.4334	1.4893	315.2	207.4	89.1
41	04	1164	Jun 06	21:43:27	840	-10335	T	-p	0.2912	2.2957	1.3510	313.1	203.7	79.5

42	05	1182	Jun 18	05:09:25	782	-10112	T	-a	0.3657	2.1596	1.2136	310.3	198.7	65.1	
43	06	1200	Jun 28	12:34:22	728	-9889	T	-a	0.4407	2.0230	1.0751	306.7	192.3	40.3	
44	07	1218	Jul 09	20:01:09	677	-9666	P	-a	0.5137	1.8903	0.9398	302.6	184.6	-	
45	08	1236	Jul 20	03:28:54	630	-9443	P	-a	0.5855	1.7602	0.8065	297.7	175.3	-	
46	09	1254	Jul 31	11:01:35	585	-9220	P	-a	0.6526	1.6390	0.6816	292.6	164.8	-	
47	10	1272	Aug 10	18:37:46	544	-8997	P	-a	0.7160	1.5249	0.5632	287.0	152.9	-	
48	11	1290	Aug 22	02:19:31	505	-8774	P	-a	0.7740	1.4207	0.4544	281.4	140.0	-	
49	12	1308	Sep 01	10:07:04	469	-8551	P	-a	0.8267	1.3266	0.3552	275.9	125.9	-	
50	13	1326	Sep 12	18:02:10	435	-8328	P	-a	0.8726	1.2451	0.2684	270.7	111.1	-	
51	14	1344	Sep 23	02:03:46	404	-8105	P	-a	0.9124	1.1748	0.1928	266.0	95.4	-	
52	15	1362	Oct 04	10:12:08	374	-7882	P	-a	0.9460	1.1158	0.1284	261.9	78.7	-	
53	16	1380	Oct 14	18:27:37	346	-7659	P	-a	0.9731	1.0688	0.0759	258.6	61.1	-	
54	17	1398	Oct 26	02:50:02	319	-7436	P	-a	0.9943	1.0325	0.0346	256.1	41.6	-	
55	18	1416	Nov 05	11:17:37	294	-7213	P	-a	1.0107	1.0048	0.0019	254.3	9.9	-	
56	19	1434	Nov 16	19:50:42	271	-6990	N	-a	1.0223	0.9858	-0.0216	253.4	-	-	
57	20	1452	Nov 27	04:26:52	248	-6767	N	-a	1.0311	0.9717	-0.0397	252.8	-	-	
58	21	1470	Dec 08	13:05:59	227	-6544	N	-a	1.0369	0.9627	-0.0521	252.8	-	-	
59	22	1488	Dec 18	21:43:56	207	-6321	N	-a	1.0434	0.9523	-0.0655	252.6	-	-	
60	23	1506	Dec 30	06:22:25	189	-6098	N	-a	1.0490	0.9433	-0.0769	252.4	-	-	
61	24	1525	Jan 09	14:56:50	171	-5875	N	-a	1.0577	0.9283	-0.0938	251.7	-	-	
62	25	1543	Jan 20	23:27:44	155	-5652	N	-a	1.0685	0.9092	-0.1143	250.3	-	-	
63	26	1561	Jan 31	07:51:02	141	-5429	N	-a	1.0850	0.8795	-0.1450	247.8	-	-	
64	27	1579	Feb 11	16:08:35	129	-5206	N	-a	1.1054	0.8424	-0.1828	244.2	-	-	
65	28	1597	Mar 04	00:16:53	120	-4983	N	-a	1.1329	0.7921	-0.2335	238.7	-	-	
66	29	1615	Mar 15	08:16:13	101	-4760	N	-a	1.1667	0.7300	-0.2956	231.4	-	-	
67	30	1633	Mar 25	16:05:28	74	-4537	N	-a	1.2080	0.6543	-0.3715	221.4	-	-	
68	31	1651	Apr 05	23:45:28	47	-4314	N	-a	1.2558	0.5668	-0.4593	208.5	-	-	
69	32	1669	Apr 16	07:15:32	24	-4091	N	-h	1.3108	0.4660	-0.5604	191.5	-	-	

70	33	1687 Apr 27 14:36:00	10	-3868	N	-h	1.3727	0.3527	-0.6741	169.0	-	-
71	34	1705 May 08 21:47:46	9	-3645	N	-h	1.4404	0.2288	-0.7989	138.1	-	-
72	35	1723 May 20 04:51:53	10	-3422	Ne	-t	1.5130	0.0963	-0.9326	91.0	-	-

SAROS SERIES

98

Saros series 98 contains 74 lunar eclipses.

PHASE													
DURATIONS													
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-39	0436 Feb 18 12:09:44	6310	-19343	Nb	a-	1.5443	0.0056	-0.9573	20.1	-	-	
02	-38	0454 Feb 28 20:27:21	6132	-19120	N	a-	1.5172	0.0544	-0.9067	62.3	-	-	
03	-37	0472 Mar 11 04:34:10	5955	-18897	N	a-	1.4822	0.1178	-0.8415	91.3	-	-	
04	-36	0490 Mar 22 12:34:42	5778	-18674	N	a-	1.4425	0.1898	-0.7680	115.3	-	-	
05	-35	0508 Apr 01 20:25:03	5601	-18451	N	a-	1.3949	0.2765	-0.6802	138.3	-	-	
06	-34	0526 Apr 13 04:09:35	5425	-18228	N	a-	1.3433	0.3709	-0.5850	159.0	-	-	

07	-33	0544	Apr 23	11:45:05	5249	-18005	N	a-	1.2848	0.4781	-0.4775	179.0	-	-
08	-32	0562	May 04	19:16:30	5075	-17782	N	a-	1.2233	0.5911	-0.3648	197.3	-	-
09	-31	0580	May 15	02:41:40	4902	-17559	N	a-	1.1570	0.7131	-0.2437	214.6	-	-
10	-30	0598	May 26	10:03:29	4731	-17336	N	a-	1.0884	0.8398	-0.1184	230.5	-	-
11	-29	0616	Jun 05	17:22:01	4560	-17113	P	a-	1.0173	0.9713	0.0109	245.2	23.2	-
12	-28	0634	Jun 17	00:39:45	4392	-16890	P	a-	0.9459	1.1037	0.1406	258.6	82.0	-
13	-27	0652	Jun 27	07:56:56	4225	-16667	P	a-	0.8746	1.2363	0.2698	270.6	111.9	-
14	-26	0670	Jul 08	15:14:59	4059	-16444	P	a-	0.8044	1.3670	0.3966	281.4	133.5	-
15	-25	0688	Jul 18	22:35:37	3896	-16221	P	a-	0.7369	1.4932	0.5183	290.9	150.2	-
16	-24	0706	Jul 30	05:59:52	3734	-15998	P	a-	0.6726	1.6136	0.6336	299.3	163.5	-
17	-23	0724	Aug 09	13:28:17	3575	-15775	P	a-	0.6127	1.7263	0.7409	306.7	174.2	-
18	-22	0742	Aug 20	21:02:12	3418	-15552	P	a-	0.5580	1.8296	0.8384	313.0	182.8	-
19	-21	0760	Aug 31	04:42:27	3264	-15329	P	a-	0.5094	1.9218	0.9246	318.4	189.6	-
20	-20	0778	Sep 11	12:29:30	3113	-15106	P	a-	0.4670	2.0028	0.9993	323.1	195.0	-
21	-19	0796	Sep 21	20:22:35	2965	-14883	T	p-	0.4303	2.0732	1.0635	327.1	199.3	38.4
22	-18	0814	Oct 03	04:23:30	2820	-14660	T	p-	0.4009	2.1303	1.1144	330.5	202.6	50.8
23	-17	0832	Oct 13	12:31:07	2679	-14437	T	p-	0.3781	2.1753	1.1533	333.5	205.1	58.2
24	-16	0850	Oct 24	20:45:26	2541	-14214	T	p-	0.3612	2.2091	1.1815	336.0	207.0	62.9
25	-15	0868	Nov 04	05:04:36	2408	-13991	T	p-	0.3491	2.2339	1.2010	338.2	208.4	65.9
26	-14	0886	Nov 15	13:28:41	2278	-13768	T	p-	0.3417	2.2499	1.2123	340.0	209.4	67.6
27	-13	0904	Nov 25	21:55:42	2152	-13545	T	p-	0.3375	2.2599	1.2180	341.7	210.2	68.5
28	-12	0922	Dec 07	06:23:41	2031	-13322	T	p-	0.3348	2.2664	1.2210	343.2	210.9	69.0
29	-11	0940	Dec 17	14:51:55	1914	-13099	T	p-	0.3331	2.2712	1.2227	344.6	211.6	69.4
30	-10	0958	Dec 28	23:17:44	1801	-12876	T	p-	0.3302	2.2777	1.2269	346.0	212.3	70.1
31	-09	0977	Jan 08	07:40:11	1693	-12653	T	p-	0.3252	2.2877	1.2352	347.5	213.3	71.4
32	-08	0995	Jan 19	15:56:11	1590	-12430	T	p-	0.3157	2.3058	1.2522	349.0	214.6	73.7
33	-07	1013	Jan 30	00:06:26	1491	-12207	T	p-	0.3023	2.3306	1.2763	350.7	216.2	76.7
34	-06	1031	Feb 10	08:07:50	1397	-11984	T	p-	0.2828	2.3666	1.3120	352.6	218.2	80.6

35	-05	1049	Feb 20	16:00:09	1308	-11761	T+	pp	0.2564	2.4150	1.3604	354.7	220.5	85.3
36	-04	1067	Mar 03	23:42:08	1223	-11538	T+	pp	0.2223	2.4774	1.4232	356.9	223.0	90.5
37	-03	1085	Mar 14	07:14:33	1142	-11315	T+	pp	0.1811	2.5528	1.4988	359.1	225.6	95.5
38	-02	1103	Mar 25	14:36:57	1066	-11092	T+	pp	0.1325	2.6418	1.5882	361.1	228.1	99.9
39	-01	1121	Apr 04	21:48:29	994	-10869	T+	pp	0.0758	2.7458	1.6924	363.0	230.1	103.3
40	00	1139	Apr 16	04:51:10	927	-10646	T+	pp	0.0124	2.8620	1.8088	364.3	231.3	105.0
41	01	1157	Apr 26	11:44:52	864	-10423	T-	pp	-0.0579	2.7787	1.7253	365.1	231.6	104.4
42	02	1175	May 07	18:31:15	804	-10200	T-	pp	-0.1334	2.6403	1.5865	364.9	230.4	100.9
43	03	1193	May 18	01:10:42	749	-9977	T-	pp	-0.2140	2.4929	1.4382	363.8	227.6	93.2
44	04	1211	May 29	07:45:32	697	-9754	T	-t	-0.2977	2.3398	1.2840	361.5	222.9	79.8
45	05	1229	Jun 08	14:17:10	648	-9531	T	-t	-0.3836	2.1831	1.1256	358.0	216.0	56.1
46	06	1247	Jun 19	20:45:31	602	-9308	P	-t	-0.4714	2.0230	0.9636	353.1	206.5	-
47	07	1265	Jun 30	03:14:06	560	-9085	P	-t	-0.5583	1.8647	0.8028	347.0	194.4	-
48	08	1283	Jul 11	09:42:53	520	-8862	P	-t	-0.6444	1.7081	0.6435	339.5	179.1	-
49	09	1301	Jul 21	16:15:37	483	-8639	P	-t	-0.7266	1.5588	0.4911	330.9	160.6	-
50	10	1319	Aug 01	22:50:32	449	-8416	P	-t	-0.8064	1.4142	0.3431	321.2	137.5	-
51	11	1337	Aug 12	05:32:46	416	-8193	P	-t	-0.8797	1.2814	0.2066	311.0	109.0	-
52	12	1355	Aug 23	12:20:17	386	-7970	P	-t	-0.9483	1.1575	0.0788	300.2	68.6	-
53	13	1373	Sep 02	19:16:42	357	-7747	Nx	-t	-1.0091	1.0478	-0.0346	289.5	-	-
54	14	1391	Sep 14	02:19:56	330	-7524	N	-t	-1.0641	0.9489	-0.1374	278.7	-	-
55	15	1409	Sep 24	09:33:48	304	-7301	N	-t	-1.1102	0.8662	-0.2238	268.9	-	-
56	16	1427	Oct 05	16:55:33	280	-7078	N	-t	-1.1500	0.7951	-0.2985	259.7	-	-
57	17	1445	Oct 16	00:26:27	257	-6855	N	-t	-1.1823	0.7374	-0.3593	251.8	-	-
58	18	1463	Oct 27	08:05:16	235	-6632	N	-t	-1.2081	0.6913	-0.4081	245.0	-	-
59	19	1481	Nov 06	15:52:48	215	-6409	N	-t	-1.2265	0.6587	-0.4429	240.0	-	-
60	20	1499	Nov 17	23:45:52	196	-6186	N	-t	-1.2408	0.6331	-0.4700	235.8	-	-
61	21	1517	Nov 28	07:44:09	178	-5963	N	-t	-1.2509	0.6150	-0.4889	232.8	-	-
62	22	1535	Dec 09	15:45:20	162	-5740	N	-t	-1.2588	0.6006	-0.5034	230.2	-	-

63	23	1553	Dec 19	23:49:19	147	-5517	N	-t	-1.2643	0.5901	-0.5132	228.2	-	-
64	24	1571	Dec 31	07:51:32	134	-5294	N	-t	-1.2712	0.5767	-0.5249	225.6	-	-
65	25	1590	Jan 20	15:53:21	123	-5071	N	-t	-1.2783	0.5624	-0.5370	222.7	-	-
66	26	1608	Jan 31	23:50:22	110	-4848	N	-t	-1.2894	0.5405	-0.5558	218.3	-	-
67	27	1626	Feb 11	07:43:56	85	-4625	N	-t	-1.3035	0.5128	-0.5797	212.7	-	-
68	28	1644	Feb 22	15:29:27	58	-4402	N	-t	-1.3240	0.4730	-0.6153	204.5	-	-
69	29	1662	Mar 04	23:10:09	32	-4179	N	-t	-1.3487	0.4254	-0.6581	194.3	-	-
70	30	1680	Mar 15	06:41:52	14	-3956	N	-t	-1.3804	0.3645	-0.7139	180.3	-	-
71	31	1698	Mar 26	14:06:38	8	-3733	N	-t	-1.4182	0.2924	-0.7806	162.0	-	-
72	32	1716	Apr 06	21:22:33	10	-3510	N	-t	-1.4634	0.2068	-0.8606	136.9	-	-
73	33	1734	Apr 18	04:32:27	11	-3287	N	-t	-1.5136	0.1117	-0.9501	101.1	-	-
74	34	1752	Apr 28	11:35:10	13	-3064	Ne	-t	-1.5698	0.0059	-1.0505	23.4	-	-

SAROS SERIES

99

Saros series 99 contains 72 lunar eclipses.

PHASE

DURATIONS

SEQ. REL. CALENDAR TD ΔT LUNA ECL. QSE GAMMA PEN. UM. PEN. PAR. TOTAL

NUM.	NUM.	DATE	OF	s	NUM	TYPE	MAG.	MAG.	m	m	m
GREATEST											
ECLIPSE											
01	-33	0555 Mar 24	03:43:32	5144 -17870	Nb t-	-1.5487	0.0532	-1.0202	71.0	-	-
02	-32	0573 Apr 03	10:40:47	4970 -17647	N t-	-1.4914	0.1577	-0.9143	121.3	-	-
03	-31	0591 Apr 14	17:27:28	4798 -17424	N t-	-1.4258	0.2773	-0.7934	159.3	-	-
04	-30	0609 Apr 25	00:08:34	4627 -17201	N t-	-1.3555	0.4058	-0.6637	190.7	-	-
05	-29	0627 May 06	06:40:15	4458 -16978	N t-	-1.2776	0.5484	-0.5204	218.9	-	-
06	-28	0645 May 16	13:09:28	4290 -16755	N t-	-1.1974	0.6953	-0.3730	243.2	-	-
07	-27	0663 May 27	19:32:50	4124 -16532	N t-	-1.1126	0.8508	-0.2174	265.1	-	-
08	-26	0681 Jun 07	01:55:18	3960 -16309	Nx t-	-1.0266	1.0086	-0.0597	284.2	-	-
09	-25	0699 Jun 18	08:15:36	3798 -16086	P t-	-0.9385	1.1707	0.1016	301.1	77.8	-
10	-24	0717 Jun 28	14:38:36	3637 -15863	P t-	-0.8523	1.3293	0.2593	315.4	121.5	-
11	-23	0735 Jul 09	21:03:32	3480 -15640	P t-	-0.7675	1.4856	0.4143	327.7	150.0	-
12	-22	0753 Jul 20	03:32:38	3325 -15417	P t-	-0.6857	1.6365	0.5635	337.9	170.8	-
13	-21	0771 Jul 31	10:07:28	3172 -15194	P t-	-0.6085	1.7792	0.7043	346.3	186.4	-
14	-20	0789 Aug 10	16:49:37	3023 -14971	P t-	-0.5370	1.9114	0.8344	353.0	198.3	-
15	-19	0807 Aug 21	23:39:45	2877 -14748	P t-	-0.4715	2.0328	0.9535	358.2	207.2	-
16	-18	0825 Sep 01	06:38:15	2734 -14525	T t-	-0.4126	2.1421	1.0605	362.3	213.9	40.0
17	-17	0843 Sep 12	13:47:07	2595 -14302	T t-	-0.3617	2.2366	1.1527	365.2	218.8	61.5
18	-16	0861 Sep 22	21:05:29	2460 -14079	T t-	-0.3183	2.3173	1.2312	367.3	222.2	73.5
19	-15	0879 Oct 04	04:33:34	2328 -13856	T p-	-0.2823	2.3843	1.2963	368.8	224.6	81.1
20	-14	0897 Oct 14	12:11:10	2201 -13633	T- p-	-0.2536	2.4378	1.3482	369.6	226.1	86.1
21	-13	0915 Oct 25	19:58:25	2078 -13410	T- p-	-0.2320	2.4781	1.3874	370.0	227.0	89.2
22	-12	0933 Nov 05	03:53:12	1959 -13187	T- p-	-0.2162	2.5072	1.4160	369.9	227.5	91.2
23	-11	0951 Nov 16	11:53:47	1845 -12964	T- p-	-0.2046	2.5286	1.4374	369.7	227.7	92.6
24	-10	0969 Nov 26	19:59:45	1735 -12741	T- p-	-0.1968	2.5426	1.4521	369.1	227.7	93.4
25	-09	0987 Dec 08	04:09:24	1630 -12518	T- p-	-0.1911	2.5523	1.4632	368.4	227.6	93.9

26	-08	1005	Dec 18	12:19:45	1530	-12295	T-	p-	-0.1856	2.5612	1.4745	367.6	227.4	94.5
27	-07	1023	Dec 29	20:30:03	1434	-12072	T-	p-	-0.1793	2.5712	1.4873	366.6	227.3	95.1
28	-06	1042	Jan 09	04:38:02	1342	-11849	T-	p-	-0.1706	2.5853	1.5053	365.6	227.3	95.9
29	-05	1060	Jan 20	12:43:26	1256	-11626	T-	pp	-0.1590	2.6044	1.5287	364.5	227.3	97.0
30	-04	1078	Jan 30	20:42:20	1173	-11403	T-	pp	-0.1414	2.6342	1.5635	363.4	227.6	98.5
31	-03	1096	Feb 11	04:36:49	1096	-11180	T-	pp	-0.1193	2.6720	1.6068	362.3	227.8	100.1
32	-02	1114	Feb 21	12:23:23	1022	-10957	T-	pp	-0.0900	2.7228	1.6635	361.1	228.1	101.7
33	-01	1132	Mar 03	20:03:48	953	-10734	T-	pp	-0.0547	2.7844	1.7312	359.8	228.2	103.0
34	00	1150	Mar 15	03:35:35	888	-10511	T-	pp	-0.0115	2.8605	1.8136	358.2	228.1	103.8
35	01	1168	Mar 25	11:01:50	827	-10288	T+	pp	0.0372	2.8101	1.7695	356.3	227.4	103.4
36	02	1186	Apr 05	18:20:26	770	-10065	T+	pp	0.0932	2.7041	1.6699	354.0	226.1	101.6
37	03	1204	Apr 16	01:33:07	717	-9842	T+	pp	0.1551	2.5875	1.5593	351.1	223.8	97.6
38	04	1222	Apr 27	08:40:32	667	-9619	T+	pp	0.2221	2.4617	1.4394	347.5	220.4	90.8
39	05	1240	May 07	15:44:15	620	-9396	T	-p	0.2929	2.3290	1.3122	343.0	215.6	80.2
40	06	1258	May 18	22:45:17	576	-9173	T	-p	0.3669	2.1906	1.1788	337.8	209.4	63.4
41	07	1276	May 29	05:44:05	536	-8950	T	-t	0.4435	2.0477	1.0405	331.5	201.4	31.4
42	08	1294	Jun 09	12:43:31	498	-8727	P	-t	0.5205	1.9045	0.9014	324.4	191.6	-
43	09	1312	Jun 19	19:43:46	462	-8504	P	-t	0.5971	1.7620	0.7624	316.4	179.9	-
44	10	1330	Jul 01	02:46:07	429	-8281	P	-t	0.6729	1.6215	0.6250	307.6	166.1	-
45	11	1348	Jul 11	09:52:30	397	-8058	P	-h	0.7460	1.4861	0.4919	298.1	150.0	-
46	12	1366	Jul 22	17:04:01	368	-7835	P	-h	0.8156	1.3574	0.3652	288.1	131.3	-
47	13	1384	Aug 02	00:22:35	340	-7612	P	-a	0.8800	1.2387	0.2478	277.9	109.7	-
48	14	1402	Aug 13	07:47:03	314	-7389	P	-a	0.9402	1.1276	0.1376	267.5	82.8	-
49	15	1420	Aug 23	15:21:06	289	-7166	P	-a	0.9934	1.0299	0.0404	257.5	45.3	-
50	16	1438	Sep 03	23:02:41	266	-6943	N	-a	1.0411	0.9422	-0.0470	247.9	-	-
51	17	1456	Sep 14	06:54:33	244	-6720	N	-a	1.0812	0.8686	-0.1207	239.1	-	-
52	18	1474	Sep 25	14:54:00	223	-6497	N	-a	1.1158	0.8051	-0.1843	231.1	-	-
53	19	1492	Oct 05	23:04:19	203	-6274	N	-a	1.1424	0.7565	-0.2332	224.5	-	-

54	20	1510 Oct 17 07:22:00	185 -6051	N -a	1.1637	0.7175	-0.2724	219.0	-	-
55	21	1528 Oct 27 15:48:36	168 -5828	N -a	1.1786	0.6902	-0.2998	214.8	-	-
56	22	1546 Nov 08 00:21:33	152 -5605	N -a	1.1891	0.6709	-0.3188	211.7	-	-
57	23	1564 Nov 18 09:01:33	139 -5382	N -a	1.1947	0.6604	-0.3288	209.8	-	-
58	24	1582 Dec 09 17:45:08	127 -5159	N -a	1.1977	0.6544	-0.3340	208.5	-	-
59	25	1600 Dec 20 02:31:54	117 -4936	N -a	1.1989	0.6515	-0.3356	207.6	-	-
60	26	1618 Dec 31 11:19:57	95 -4713	N -a	1.1997	0.6492	-0.3361	206.8	-	-
61	27	1637 Jan 10 20:08:48	68 -4490	N -a	1.2007	0.6462	-0.3369	205.9	-	-
62	28	1655 Jan 22 04:54:43	42 -4267	N -a	1.2045	0.6379	-0.3425	204.3	-	-
63	29	1673 Feb 01 13:38:12	20 -4044	N -a	1.2108	0.6248	-0.3525	202.0	-	-
64	30	1691 Feb 12 22:16:33	9 -3821	N -a	1.2219	0.6027	-0.3712	198.4	-	-
65	31	1709 Feb 24 06:50:38	9 -3598	N -a	1.2369	0.5733	-0.3970	193.7	-	-
66	32	1727 Mar 07 15:16:35	10 -3375	N -a	1.2592	0.5304	-0.4359	186.7	-	-
67	33	1745 Mar 17 23:37:12	12 -3152	N -a	1.2862	0.4789	-0.4836	177.9	-	-
68	34	1763 Mar 29 07:49:13	15 -2929	N -a	1.3206	0.4140	-0.5447	166.2	-	-
69	35	1781 Apr 08 15:55:06	17 -2706	N -a	1.3602	0.3394	-0.6156	151.3	-	-
70	36	1799 Apr 19 23:52:13	14 -2483	N -a	1.4072	0.2513	-0.7003	131.1	-	-
71	37	1817 May 01 07:44:01	12 -2260	N -a	1.4587	0.1554	-0.7931	103.9	-	-
72	38	1835 May 12 15:28:42	6 -2037	Ne -a	1.5160	0.0489	-0.8969	58.8	-	-

SAROS SERIES

100

Saros series 100 contains 79 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-42	0439 Dec 06 18:28:44	6273 -19296	N	a-	1.5720	0.0057	-1.0584	22.5	-	-	-	-	-
02	-41	0457 Dec 17 02:49:24	6095 -19073	N	a-	1.5642	0.0185	-1.0423	40.5	-	-	-	-	-
03	-40	0475 Dec 28 11:11:04	5917 -18850	N	a-	1.5564	0.0307	-1.0262	51.9	-	-	-	-	-
04	-39	0494 Jan 07 19:29:20	5741 -18627	N	a-	1.5456	0.0483	-1.0041	64.8	-	-	-	-	-
05	-38	0512 Jan 19 03:44:14	5564 -18404	N	a-	1.5313	0.0719	-0.9753	78.5	-	-	-	-	-
06	-37	0530 Jan 29 11:53:03	5388 -18181	N	a-	1.5117	0.1050	-0.9366	94.2	-	-	-	-	-
07	-36	0548 Feb 09 19:56:47	5212 -17958	N	a-	1.4871	0.1472	-0.8884	110.7	-	-	-	-	-
08	-35	0566 Feb 20 03:53:05	5039 -17735	N	a-	1.4558	0.2014	-0.8280	128.2	-	-	-	-	-
09	-34	0584 Mar 02 11:42:34	4866 -17512	N	a-	1.4183	0.2671	-0.7558	146.1	-	-	-	-	-
10	-33	0602 Mar 13 19:24:44	4695 -17289	N	a-	1.3739	0.3452	-0.6711	164.1	-	-	-	-	-
11	-32	0620 Mar 24 03:00:44	4525 -17066	N	a-	1.3235	0.4345	-0.5755	181.7	-	-	-	-	-
12	-31	0638 Apr 04 10:29:18	4356 -16843	N	a-	1.2660	0.5368	-0.4669	199.1	-	-	-	-	-
13	-30	0656 Apr 14 17:53:08	4190 -16620	N	a-	1.2035	0.6485	-0.3492	215.5	-	-	-	-	-
14	-29	0674 Apr 26 01:11:35	4025 -16397	N	a-	1.1354	0.7707	-0.2214	231.0	-	-	-	-	-
15	-28	0692 May 06 08:27:53	3861 -16174	N	a-	1.0645	0.8982	-0.0888	245.0	-	-	-	-	-
16	-27	0710 May 17 15:39:32	3700 -15951	P	a-	0.9885	1.0352	0.0528	258.1	51.8	-	-	-	-
17	-26	0728 May 27 22:51:52	3542 -15728	P	a-	0.9121	1.1733	0.1950	269.6	97.3	-	-	-	-

18	-25	0746	Jun 08	06:02:24	3386	-15505	P	a-	0.8329	1.3169	0.3421	279.9	125.8	-
19	-24	0764	Jun 18	13:15:57	3232	-15282	P	a-	0.7555	1.4575	0.4856	288.6	146.2	-
20	-23	0782	Jun 29	20:30:03	3082	-15059	P	a-	0.6776	1.5993	0.6296	296.1	162.3	-
21	-22	0800	Jul 10	03:50:05	2934	-14836	P	a-	0.6037	1.7340	0.7660	302.2	174.5	-
22	-21	0818	Jul 21	11:13:59	2790	-14613	P	a-	0.5321	1.8649	0.8979	307.2	184.2	-
23	-20	0836	Jul 31	18:44:36	2650	-14390	T	a-	0.4654	1.9871	1.0207	311.2	191.7	21.7
24	-19	0854	Aug 12	02:21:32	2513	-14167	T	a-	0.4033	2.1010	1.1347	314.2	197.3	53.4
25	-18	0872	Aug 22	10:06:58	2380	-13944	T	a-	0.3477	2.2031	1.2364	316.4	201.5	68.4
26	-17	0890	Sep 02	18:00:35	2251	-13721	T	p-	0.2983	2.2942	1.3268	318.0	204.4	77.7
27	-16	0908	Sep 13	02:02:20	2126	-13498	T+	p-	0.2550	2.3741	1.4057	319.1	206.5	84.0
28	-15	0926	Sep 24	10:13:22	2006	-13275	T+	p-	0.2190	2.4406	1.4711	319.8	207.9	88.1
29	-14	0944	Oct 04	18:32:45	1890	-13052	T+	p-	0.1896	2.4952	1.5246	320.1	208.8	90.8
30	-13	0962	Oct 16	03:00:36	1778	-12829	T+	p-	0.1670	2.5372	1.5655	320.3	209.2	92.5
31	-12	0980	Oct 26	11:35:12	1671	-12606	T+	p-	0.1498	2.5694	1.5967	320.3	209.5	93.6
32	-11	0998	Nov 06	20:16:42	1569	-12383	T+	p-	0.1379	2.5915	1.6181	320.2	209.5	94.2
33	-10	1016	Nov 17	05:02:51	1471	-12160	T+	p-	0.1298	2.6066	1.6328	320.0	209.5	94.6
34	-09	1034	Nov 28	13:52:33	1378	-11937	T+	p-	0.1246	2.6161	1.6422	319.7	209.4	94.8
35	-08	1052	Dec 08	22:44:34	1289	-11714	T+	p-	0.1212	2.6221	1.6486	319.5	209.3	94.9
36	-07	1070	Dec 20	07:37:34	1205	-11491	T+	p-	0.1190	2.6258	1.6531	319.2	209.3	95.0
37	-06	1088	Dec 30	16:29:04	1126	-11268	T+	p-	0.1152	2.6321	1.6608	319.0	209.3	95.2
38	-05	1107	Jan 11	01:17:57	1051	-11045	T+	p-	0.1092	2.6423	1.6726	318.8	209.4	95.5
39	-04	1125	Jan 21	10:02:47	980	-10822	T+	p-	0.0998	2.6585	1.6908	318.6	209.6	96.0
40	-03	1143	Feb 01	18:43:18	913	-10599	T+	p-	0.0870	2.6808	1.7154	318.5	209.9	96.7
41	-02	1161	Feb 12	03:16:14	851	-10376	T+	p-	0.0677	2.7150	1.7521	318.5	210.2	97.4
42	-01	1179	Feb 23	11:43:09	792	-10153	T+	pp	0.0435	2.7581	1.7978	318.5	210.6	98.1
43	00	1197	Mar 05	20:01:37	737	-9930	T+	pp	0.0119	2.8148	1.8571	318.4	210.9	98.7
44	01	1215	Mar 17	04:13:33	686	-9707	T-	pp	-0.0249	2.7896	1.8344	318.3	211.1	98.7
45	02	1233	Mar 27	12:15:38	638	-9484	T-	pp	-0.0700	2.7058	1.7529	318.0	210.8	98.0

46	03	1251	Apr 07	20:11:51	593	-9261	T-	-p	-0.1198	2.6134	1.6625	317.5	210.1	96.0
47	04	1269	Apr 18	03:59:31	551	-9038	T-	-p	-0.1768	2.5079	1.5585	316.5	208.6	92.4
48	05	1287	Apr 29	11:41:31	512	-8815	T-	-p	-0.2383	2.3946	1.4463	315.0	206.3	86.5
49	06	1305	May 09	19:16:38	476	-8592	T	-p	-0.3054	2.2711	1.3234	312.8	202.8	77.1
50	07	1323	May 21	02:48:09	442	-8369	T	-a	-0.3753	2.1430	1.1953	310.0	198.0	62.6
51	08	1341	May 31	10:15:31	409	-8146	T	-a	-0.4482	2.0095	1.0612	306.4	191.6	36.5
52	09	1359	Jun 11	17:39:47	379	-7923	P	-a	-0.5233	1.8723	0.9228	301.9	183.5	-
53	10	1377	Jun 22	01:02:58	351	-7700	P	-a	-0.5989	1.7346	0.7831	296.5	173.5	-
54	11	1395	Jul 03	08:26:04	324	-7477	P	-a	-0.6743	1.5974	0.6434	290.2	161.2	-
55	12	1413	Jul 13	15:50:27	299	-7254	P	-a	-0.7479	1.4639	0.5068	283.2	146.5	-
56	13	1431	Jul 24	23:16:42	275	-7031	P	-a	-0.8195	1.3344	0.3735	275.4	128.6	-
57	14	1449	Aug 04	06:47:06	252	-6808	P	-a	-0.8872	1.2124	0.2473	267.0	106.8	-
58	15	1467	Aug 15	14:22:17	231	-6585	P	-a	-0.9504	1.0988	0.1289	258.4	78.6	-
59	16	1485	Aug 25	22:01:58	211	-6362	P	-a	-1.0093	0.9933	0.0183	249.4	30.1	-
60	17	1503	Sep 06	05:48:25	192	-6139	N	-a	-1.0620	0.8993	-0.0811	240.6	-	-
61	18	1521	Sep 16	13:41:13	174	-5916	N	-a	-1.1087	0.8166	-0.1695	232.1	-	-
62	19	1539	Sep 27	21:41:55	158	-5693	N	-a	-1.1485	0.7464	-0.2455	224.4	-	-
63	20	1557	Oct 08	05:47:56	144	-5470	N	-a	-1.1834	0.6853	-0.3122	217.2	-	-
64	21	1575	Oct 19	14:02:17	132	-5247	N	-a	-1.2107	0.6380	-0.3652	211.4	-	-
65	22	1593	Nov 08	22:22:02	121	-5024	N	-a	-1.2329	0.6000	-0.4086	206.6	-	-
66	23	1611	Nov 20	06:48:14	105	-4801	N	-a	-1.2493	0.5724	-0.4411	203.1	-	-
67	24	1629	Nov 30	15:17:32	79	-4578	N	-a	-1.2625	0.5505	-0.4676	200.4	-	-
68	25	1647	Dec 11	23:51:13	52	-4355	N	-a	-1.2717	0.5357	-0.4864	198.7	-	-
69	26	1665	Dec 22	08:25:41	28	-4132	N	-a	-1.2796	0.5230	-0.5028	197.3	-	-
70	27	1684	Jan 02	17:00:34	12	-3909	N	-a	-1.2865	0.5119	-0.5169	196.1	-	-
71	28	1702	Jan 14	01:33:37	8	-3686	N	-a	-1.2943	0.4988	-0.5324	194.5	-	-
72	29	1720	Jan 25	10:04:09	10	-3463	N	-a	-1.3033	0.4832	-0.5498	192.3	-	-
73	30	1738	Feb 04	18:29:02	11	-3240	N	-a	-1.3164	0.4597	-0.5747	188.6	-	-

74	31	1756 Feb 16	02:47:53	14	-3017	N	-a	-1.3339	0.4282	-0.6071	183.2	-	-
75	32	1774 Feb 26	10:58:53	16	-2794	N	-a	-1.3568	0.3865	-0.6494	175.3	-	-
76	33	1792 Mar 08	19:02:23	16	-2571	N	-a	-1.3848	0.3351	-0.7011	164.5	-	-
77	34	1810 Mar 21	02:54:49	12	-2348	N	-a	-1.4209	0.2689	-0.7674	148.7	-	-
78	35	1828 Mar 31	10:38:46	8	-2125	N	-h	-1.4630	0.1917	-0.8446	126.9	-	-
79	36	1846 Apr 11	18:11:36	6	-1902	N	-h	-1.5131	0.0998	-0.9366	92.6	-	-

SAROS SERIES

101

Saros series 101 contains 83 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-49	0360 Sep 11	22:17:15	7055	-20276	N	a-	-1.5179	0.0515	-0.9065	60.5	-	-	
02	-48	0378 Sep 23	06:34:46	6878	-20053	N	a-	-1.4867	0.1099	-0.8505	87.9	-	-	
03	-47	0396 Oct 03	14:59:50	6700	-19830	N	a-	-1.4618	0.1567	-0.8060	104.5	-	-	

04	-46	0414 Oct 14	23:32:16	6522 -19607	N	a-	-1.4429	0.1927	-0.7723	115.5	-	-
05	-45	0432 Oct 25	08:11:22	6343 -19384	N	a-	-1.4296	0.2182	-0.7489	122.7	-	-
06	-44	0450 Nov 05	16:56:38	6165 -19161	N	a-	-1.4212	0.2344	-0.7345	127.0	-	-
07	-43	0468 Nov 16	01:45:15	5987 -18938	N	a-	-1.4158	0.2451	-0.7253	129.8	-	-
08	-42	0486 Nov 27	10:37:44	5810 -18715	N	a-	-1.4138	0.2493	-0.7222	130.9	-	-
09	-41	0504 Dec 07	19:30:38	5634 -18492	N	a-	-1.4123	0.2524	-0.7197	131.8	-	-
10	-40	0522 Dec 19	04:24:18	5457 -18269	N	a-	-1.4120	0.2531	-0.7193	132.0	-	-
11	-39	0540 Dec 29	13:14:13	5281 -18046	N	a-	-1.4089	0.2586	-0.7135	133.5	-	-
12	-38	0559 Jan 09	22:02:29	5107 -17823	N	a-	-1.4049	0.2656	-0.7059	135.3	-	-
13	-37	0577 Jan 20	06:44:41	4934 -17600	N	a-	-1.3962	0.2812	-0.6894	139.1	-	-
14	-36	0595 Jan 31	15:21:36	4762 -17377	N	a-	-1.3838	0.3033	-0.6661	144.3	-	-
15	-35	0613 Feb 10	23:50:12	4592 -17154	N	a-	-1.3651	0.3370	-0.6311	151.8	-	-
16	-34	0631 Feb 22	08:12:23	4423 -16931	N	a-	-1.3416	0.3793	-0.5874	160.6	-	-
17	-33	0649 Mar 04	16:25:34	4255 -16708	N	a-	-1.3112	0.4345	-0.5308	171.2	-	-
18	-32	0667 Mar 16	00:30:20	4089 -16485	N	a-	-1.2744	0.5013	-0.4628	183.0	-	-
19	-31	0685 Mar 26	08:26:20	3926 -16262	N	a-	-1.2310	0.5805	-0.3826	195.7	-	-
20	-30	0703 Apr 06	16:14:43	3764 -16039	N	a-	-1.1820	0.6702	-0.2923	208.9	-	-
21	-29	0721 Apr 16	23:54:57	3604 -15816	N	a-	-1.1268	0.7714	-0.1909	222.3	-	-
22	-28	0739 Apr 28	07:28:09	3447 -15593	N	a-	-1.0662	0.8826	-0.0799	235.6	-	-
23	-27	0757 May 08	14:55:18	3292 -15370	P	a-	-1.0014	1.0020	0.0387	248.6	43.5	-
24	-26	0775 May 19	22:17:38	3141 -15147	P	a-	-0.9333	1.1276	0.1630	260.9	88.1	-
25	-25	0793 May 30	05:34:46	2992 -14924	P	a-	-0.8615	1.2604	0.2938	272.7	116.4	-
26	-24	0811 Jun 10	12:50:09	2847 -14701	P	a-	-0.7888	1.3950	0.4258	283.5	137.8	-
27	-23	0829 Jun 20	20:03:13	2705 -14478	P	a-	-0.7151	1.5318	0.5594	293.4	155.2	-
28	-22	0847 Jul 02	03:17:32	2566 -14255	P	a-	-0.6429	1.6662	0.6900	302.2	169.3	-
29	-21	0865 Jul 12	10:31:09	2432 -14032	P	a-	-0.5710	1.8004	0.8198	310.2	181.1	-
30	-20	0883 Jul 23	17:49:11	2301 -13809	P	a-	-0.5035	1.9267	0.9412	317.0	190.5	-
31	-19	0901 Aug 03	01:09:31	2175 -13586	T	a-	-0.4388	2.0482	1.0573	323.0	198.2	36.5

32	-18	0919 Aug 14 08:35:22	2053 -13363	T	p-	-0.3793	2.1603	1.1637	328.2	204.3	59.8
33	-17	0937 Aug 24 16:05:45	1935 -13140	T	p-	-0.3243	2.2643	1.2616	332.7	209.2	73.3
34	-16	0955 Sep 04 23:43:41	1822 -12917	T	p-	-0.2763	2.3555	1.3465	336.5	212.9	82.0
35	-15	0973 Sep 15 07:27:56	1713 -12694	T-	p-	-0.2346	2.4353	1.4199	339.7	215.8	87.9
36	-14	0991 Sep 26 15:18:46	1609 -12471	T-	pp	-0.1991	2.5035	1.4818	342.6	218.0	92.0
37	-13	1009 Oct 06 23:17:13	1509 -12248	T-	pp	-0.1707	2.5588	1.5308	345.1	219.7	94.7
38	-12	1027 Oct 18 07:22:25	1414 -12025	T-	pp	-0.1486	2.6025	1.5685	347.3	220.9	96.6
39	-11	1045 Oct 28 15:33:52	1324 -11802	T-	pp	-0.1325	2.6348	1.5951	349.2	221.9	97.7
40	-10	1063 Nov 08 23:49:19	1238 -11579	T-	pp	-0.1205	2.6595	1.6146	351.1	222.8	98.5
41	-09	1081 Nov 19 08:09:51	1157 -11356	T-	pp	-0.1135	2.6747	1.6251	352.7	223.5	99.0
42	-08	1099 Nov 30 16:32:22	1080 -11133	T-	pp	-0.1086	2.6858	1.6322	354.2	224.1	99.4
43	-07	1117 Dec 11 00:56:11	1007 -10910	T-	pp	-0.1054	2.6932	1.6363	355.7	224.7	99.7
44	-06	1135 Dec 22 09:18:55	939 -10687	T-	pp	-0.1019	2.7011	1.6414	357.0	225.3	100.0
45	-05	1154 Jan 01 17:39:57	875 -10464	T-	pp	-0.0975	2.7102	1.6484	358.3	226.0	100.4
46	-04	1172 Jan 13 01:56:16	815 -10241	T-	pp	-0.0899	2.7249	1.6616	359.6	226.7	101.0
47	-03	1190 Jan 23 10:07:00	759 -10018	T-	pp	-0.0782	2.7469	1.6828	360.8	227.6	101.7
48	-02	1208 Feb 03 18:10:32	706 -9795	T-	pp	-0.0610	2.7785	1.7140	362.0	228.4	102.6
49	-01	1226 Feb 14 02:06:28	657 -9572	T-	pp	-0.0381	2.8205	1.7561	363.1	229.3	103.4
50	00	1244 Feb 25 09:51:50	611 -9349	T-	pp	-0.0073	2.8769	1.8129	364.1	230.1	104.1
51	01	1262 Mar 07 17:28:17	568 -9126	T+	pp	0.0302	2.8346	1.7710	364.9	230.6	104.2
52	02	1280 Mar 18 00:53:37	527 -8903	T+	pp	0.0761	2.7500	1.6872	365.4	230.6	103.2
53	03	1298 Mar 29 08:10:17	490 -8680	T+	pp	0.1286	2.6533	1.5911	365.4	229.9	100.6
54	04	1316 Apr 08 15:14:51	455 -8457	T+	pp	0.1902	2.5400	1.4785	364.7	228.2	95.4
55	05	1334 Apr 19 22:12:11	422 -8234	T+	-p	0.2569	2.4173	1.3562	363.3	225.1	86.7
56	06	1352 Apr 30 04:59:28	391 -8011	T	-t	0.3309	2.2814	1.2205	360.7	220.2	71.9
57	07	1370 May 11 11:41:22	362 -7788	T	-t	0.4088	2.1386	1.0777	357.0	213.3	44.8
58	08	1388 May 21 18:15:06	335 -7565	P	-t	0.4926	1.9850	0.9237	351.9	203.7	-
59	09	1406 Jun 02 00:46:25	309 -7342	P	-t	0.5777	1.8292	0.7671	345.3	191.2	-

60	10	1424	Jun 12	07:13:02	284	-7119	P	-t	0.6657	1.6684	0.6051	337.1	174.8	-
61	11	1442	Jun 23	13:39:06	261	-6896	P	-t	0.7535	1.5081	0.4432	327.3	153.7	-
62	12	1460	Jul 03	20:04:26	239	-6673	P	-t	0.8412	1.3481	0.2813	315.7	125.7	-
63	13	1478	Jul 15	02:32:38	219	-6450	P	-t	0.9258	1.1940	0.1249	302.7	85.8	-
64	14	1496	Jul 25	09:03:59	199	-6227	Nx	-t	1.0074	1.0457	-0.0260	288.3	-	-
65	15	1514	Aug 05	15:39:55	181	-6004	N	-t	1.0845	0.9055	-0.1690	272.6	-	-
66	16	1532	Aug 15	22:22:09	164	-5781	N	-t	1.1559	0.7761	-0.3016	256.0	-	-
67	17	1550	Aug 27	05:11:29	149	-5558	N	-t	1.2210	0.6583	-0.4226	238.8	-	-
68	18	1568	Sep 06	12:08:34	136	-5335	N	-t	1.2796	0.5524	-0.5317	221.2	-	-
69	19	1586	Sep 27	19:14:33	125	-5112	N	-t	1.3306	0.4604	-0.6270	203.8	-	-
70	20	1604	Oct 08	02:29:43	113	-4889	N	-t	1.3742	0.3821	-0.7084	187.1	-	-
71	21	1622	Oct 19	09:54:38	90	-4666	N	-t	1.4097	0.3184	-0.7750	171.9	-	-
72	22	1640	Oct 29	17:27:12	63	-4443	N	-t	1.4390	0.2657	-0.8301	157.8	-	-
73	23	1658	Nov 10	01:09:24	37	-4220	N	-t	1.4609	0.2267	-0.8712	146.2	-	-
74	24	1676	Nov 20	08:58:24	17	-3997	N	-t	1.4777	0.1967	-0.9028	136.5	-	-
75	25	1694	Dec 01	16:54:29	8	-3774	N	-t	1.4889	0.1765	-0.9238	129.5	-	-
76	26	1712	Dec 13	00:53:52	9	-3551	N	-t	1.4977	0.1604	-0.9401	123.4	-	-
77	27	1730	Dec 24	08:58:03	11	-3328	N	-t	1.5032	0.1500	-0.9498	119.3	-	-
78	28	1749	Jan 03	17:03:06	13	-3105	N	-t	1.5085	0.1396	-0.9589	115.0	-	-
79	29	1767	Jan 15	01:08:11	15	-2882	N	-t	1.5141	0.1283	-0.9680	110.2	-	-
80	30	1785	Jan 25	09:10:57	17	-2659	N	-t	1.5218	0.1127	-0.9808	103.2	-	-
81	31	1803	Feb 06	17:10:42	13	-2436	N	-t	1.5322	0.0918	-0.9980	93.0	-	-
82	32	1821	Feb 17	01:05:17	11	-2213	N	-t	1.5470	0.0626	-1.0230	76.8	-	-
83	33	1839	Feb 28	08:53:39	5	-1990	Ne	-t	1.5671	0.0232	-1.0576	46.8	-	-

SAROS SERIES

102

Saros series 102 contains 84 lunar eclipses.

													PHASE
													DURATIONS
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-35	0461 Oct 05	14:59:50	6057 -19026	Nb t-	1.5718	0.0033	-1.0551	17.3	-	-	-	-
02	-34	0479 Oct 16	22:54:35	5880 -18803	N t-	1.5537	0.0393	-1.0249	59.5	-	-	-	-
03	-33	0497 Oct 27	06:55:24	5704 -18580	N t-	1.5411	0.0652	-1.0043	76.8	-	-	-	-
04	-32	0515 Nov 07	15:00:56	5527 -18357	N t-	1.5328	0.0829	-0.9913	86.8	-	-	-	-
05	-31	0533 Nov 17	23:11:15	5351 -18134	N t-	1.5291	0.0916	-0.9867	91.4	-	-	-	-
06	-30	0551 Nov 29	07:22:40	5176 -17911	N t-	1.5266	0.0978	-0.9837	94.7	-	-	-	-
07	-29	0569 Dec 09	15:35:23	5002 -17688	N t-	1.5258	0.1007	-0.9835	96.4	-	-	-	-
08	-28	0587 Dec 20	23:46:02	4830 -17465	N t-	1.5237	0.1054	-0.9807	98.8	-	-	-	-
09	-27	0605 Dec 31	07:55:11	4659 -17242	N t-	1.5209	0.1111	-0.9761	101.6	-	-	-	-
10	-26	0624 Jan 11	15:57:41	4489 -17019	N t-	1.5136	0.1247	-0.9628	107.8	-	-	-	-
11	-25	0642 Jan 21	23:56:00	4321 -16796	N t-	1.5033	0.1435	-0.9438	115.6	-	-	-	-
12	-24	0660 Feb 02	07:45:06	4155 -16573	N t-	1.4862	0.1745	-0.9121	127.3	-	-	-	-
13	-23	0678 Feb 12	15:27:08	3990 -16350	N t-	1.4638	0.2151	-0.8702	141.1	-	-	-	-

14	-22	0696	Feb 23	22:57:48	3827	-16127	N	t-	1.4326	0.2715	-0.8123	157.9	-	-
15	-21	0714	Mar 06	06:20:38	3667	-15904	N	t-	1.3954	0.3387	-0.7432	175.5	-	-
16	-20	0732	Mar 16	13:32:02	3509	-15681	N	t-	1.3497	0.4217	-0.6583	194.4	-	-
17	-19	0750	Mar 27	20:34:13	3353	-15458	N	t-	1.2966	0.5181	-0.5598	213.7	-	-
18	-18	0768	Apr 07	03:26:13	3200	-15235	N	t-	1.2353	0.6296	-0.4464	233.2	-	-
19	-17	0786	Apr 18	10:10:53	3050	-15012	N	t-	1.1680	0.7521	-0.3220	252.0	-	-
20	-16	0804	Apr 28	16:47:44	2904	-14789	N	t-	1.0944	0.8864	-0.1861	270.0	-	-
21	-15	0822	May 09	23:18:04	2760	-14566	Nx	t-	1.0154	1.0307	-0.0404	286.9	-	-
22	-14	0840	May 20	05:43:53	2620	-14343	P	t-	0.9323	1.1827	0.1125	302.3	81.7	-
23	-13	0858	May 31	12:06:43	2484	-14120	P	t-	0.8462	1.3402	0.2708	316.3	123.9	-
24	-12	0876	Jun 10	18:27:49	2352	-13897	P	t-	0.7583	1.5013	0.4322	328.6	152.7	-
25	-11	0894	Jun 22	00:49:05	2224	-13674	P	t-	0.6701	1.6632	0.5940	339.2	174.5	-
26	-10	0912	Jul 02	07:12:37	2100	-13451	P	t-	0.5831	1.8231	0.7535	348.0	191.2	-
27	-09	0930	Jul 13	13:40:18	1981	-13228	P	t-	0.4989	1.9780	0.9077	355.2	204.1	-
28	-08	0948	Jul 23	20:11:39	1866	-13005	T	t-	0.4170	2.1288	1.0574	361.0	214.0	39.0
29	-07	0966	Aug 04	02:50:13	1755	-12782	T	t-	0.3406	2.2697	1.1969	365.3	221.2	69.0
30	-06	0984	Aug 14	09:35:35	1649	-12559	T+	pp	0.2692	2.4015	1.3272	368.4	226.3	84.7
31	-05	1002	Aug 25	16:30:31	1548	-12336	T+	pp	0.2051	2.5200	1.4440	370.4	229.7	94.0
32	-04	1020	Sep 04	23:33:25	1451	-12113	T+	pp	0.1470	2.6274	1.5496	371.6	231.8	99.7
33	-03	1038	Sep 16	06:47:20	1359	-11890	T+	pp	0.0974	2.7193	1.6398	372.2	232.9	102.8
34	-02	1056	Sep 26	14:10:44	1271	-11667	T+	pp	0.0551	2.7978	1.7167	372.2	233.2	104.3
35	-01	1074	Oct 07	21:44:00	1188	-11444	T+	pp	0.0205	2.8619	1.7795	371.9	233.1	104.7
36	00	1092	Oct 18	05:26:35	1110	-11221	T-	pp	-0.0070	2.8872	1.8037	371.4	232.6	104.6
37	01	1110	Oct 29	13:18:02	1035	-10998	T-	pp	-0.0276	2.8496	1.7657	370.6	232.1	104.2
38	02	1128	Nov 08	21:17:28	966	-10775	T-	pp	-0.0425	2.8224	1.7384	369.8	231.5	103.7
39	03	1146	Nov 20	05:21:53	900	-10552	T-	pp	-0.0538	2.8013	1.7179	368.9	230.9	103.2
40	04	1164	Nov 30	13:32:27	838	-10329	T-	pp	-0.0607	2.7880	1.7058	367.8	230.3	102.8
41	05	1182	Dec 11	21:45:32	780	-10106	T-	pp	-0.0657	2.7779	1.6977	366.7	229.8	102.5

42	06	1200	Dec 22	06:00:34	726	-9883	T-	pp	-0.0701	2.7684	1.6910	365.5	229.3	102.2
43	07	1219	Jan 02	14:13:50	676	-9660	T-	pp	-0.0764	2.7551	1.6811	364.1	228.7	101.9
44	08	1237	Jan 12	22:26:14	628	-9437	T-	pp	-0.0842	2.7387	1.6689	362.7	228.1	101.5
45	09	1255	Jan 24	06:34:23	584	-9214	T-	pp	-0.0960	2.7147	1.6495	361.0	227.4	101.0
46	10	1273	Feb 03	14:37:42	543	-8991	T-	pp	-0.1123	2.6821	1.6223	359.2	226.5	100.1
47	11	1291	Feb 14	22:34:42	504	-8768	T-	pp	-0.1344	2.6386	1.5845	357.1	225.5	98.6
48	12	1309	Feb 25	06:25:40	468	-8545	T-	pp	-0.1623	2.5844	1.5364	354.8	224.0	96.5
49	13	1327	Mar 08	14:08:34	435	-8322	T-	pp	-0.1975	2.5166	1.4749	352.1	222.1	93.1
50	14	1345	Mar 18	21:44:41	403	-8099	T-	pp	-0.2390	2.4373	1.4020	349.0	219.5	88.1
51	15	1363	Mar 30	05:13:30	373	-7876	T	-p	-0.2874	2.3452	1.3164	345.4	216.1	80.6
52	16	1381	Apr 09	12:36:50	345	-7653	T	-p	-0.3410	2.2437	1.2211	341.1	211.7	69.5
53	17	1399	Apr 20	19:52:49	319	-7430	T	-p	-0.4017	2.1292	1.1127	336.0	205.8	51.3
54	18	1417	May 01	03:05:22	294	-7207	P	-t	-0.4661	2.0081	0.9973	330.1	198.6	-
55	19	1435	May 12	10:13:11	270	-6984	P	-t	-0.5356	1.8779	0.8725	323.2	189.4	-
56	20	1453	May 22	17:19:57	248	-6761	P	-t	-0.6067	1.7450	0.7446	315.4	178.2	-
57	21	1471	Jun 03	00:23:10	227	-6538	P	-t	-0.6815	1.6054	0.6094	306.4	164.3	-
58	22	1489	Jun 13	07:28:45	207	-6315	P	-h	-0.7554	1.4678	0.4757	296.6	147.8	-
59	23	1507	Jun 24	14:33:59	188	-6092	P	-h	-0.8306	1.3283	0.3394	285.5	127.0	-
60	24	1525	Jul 04	21:43:23	171	-5869	P	-h	-0.9029	1.1941	0.2080	273.8	101.0	-
61	25	1543	Jul 16	04:55:02	155	-5646	P	-h	-0.9742	1.0623	0.0784	261.0	62.9	-
62	26	1561	Jul 26	12:13:48	141	-5423	N	-a	-1.0402	0.9402	-0.0420	247.8	-	-
63	27	1579	Aug 06	19:37:41	129	-5200	N	-a	-1.1029	0.8248	-0.1564	234.1	-	-
64	28	1597	Aug 27	03:08:44	120	-4977	N	-a	-1.1604	0.7189	-0.2616	220.3	-	-
65	29	1615	Sep 07	10:47:18	100	-4754	N	-a	-1.2123	0.6234	-0.3568	206.5	-	-
66	30	1633	Sep 17	18:34:53	74	-4531	N	-a	-1.2576	0.5404	-0.4399	193.3	-	-
67	31	1651	Sep 29	02:31:07	46	-4308	N	-a	-1.2966	0.4689	-0.5117	180.8	-	-
68	32	1669	Oct 09	10:35:58	24	-4085	N	-a	-1.3293	0.4092	-0.5719	169.5	-	-
69	33	1687	Oct 20	18:50:03	10	-3862	N	-a	-1.3555	0.3615	-0.6201	159.6	-	-

70	34	1705 Nov 01 03:12:43	9	-3639	N	-a	-1.3753	0.3252	-0.6568	151.6	-	-
71	35	1723 Nov 12 11:42:32	10	-3416	N	-a	-1.3902	0.2982	-0.6842	145.2	-	-
72	36	1741 Nov 22 20:19:31	12	-3193	N	-a	-1.3999	0.2804	-0.7021	140.8	-	-
73	37	1759 Dec 04 05:01:57	14	-2970	N	-a	-1.4059	0.2693	-0.7129	137.9	-	-
74	38	1777 Dec 14 13:48:58	17	-2747	N	-a	-1.4087	0.2638	-0.7179	136.2	-	-
75	39	1795 Dec 25 22:37:34	15	-2524	N	-a	-1.4110	0.2591	-0.7215	134.9	-	-
76	40	1814 Jan 06 07:28:19	12	-2301	N	-a	-1.4118	0.2568	-0.7223	134.0	-	-
77	41	1832 Jan 17 16:18:15	7	-2078	N	-a	-1.4135	0.2527	-0.7245	132.8	-	-
78	42	1850 Jan 28 01:06:06	7	-1855	N	-a	-1.4175	0.2442	-0.7305	130.4	-	-
79	43	1868 Feb 08 09:49:41	3	-1632	N	-a	-1.4252	0.2288	-0.7433	126.2	-	-
80	44	1886 Feb 18 18:29:01	-6	-1409	N	-a	-1.4365	0.2064	-0.7627	119.9	-	-
81	45	1904 Mar 02 03:02:34	3	-1186	N	-a	-1.4528	0.1748	-0.7910	110.5	-	-
82	46	1922 Mar 13 11:28:48	23	-963	N	-a	-1.4752	0.1320	-0.8304	96.3	-	-
83	47	1940 Mar 23 19:48:19	24	-740	N	-a	-1.5033	0.0788	-0.8803	74.6	-	-
84	48	1958 Apr 04 04:00:15	32	-517	Ne	-a	-1.5380	0.0135	-0.9422	31.0	-	-

SAROS SERIES

103

Saros series 103 contains 82 lunar eclipses.

PHASE													
DURATIONS													
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-36	0472 Sep 03 12:30:19	5950 -18891	N	t-	-1.5287	0.0828	-0.9764	86.6	-	-		
02	-35	0490 Sep 14 19:57:05	5773 -18668	N	t-	-1.4826	0.1675	-0.8922	121.9	-	-		
03	-34	0508 Sep 25 03:35:20	5597 -18445	N	h-	-1.4447	0.2374	-0.8228	143.9	-	-		
04	-33	0526 Oct 06 11:21:56	5420 -18222	N	h-	-1.4128	0.2961	-0.7643	159.4	-	-		
05	-32	0544 Oct 16 19:19:38	5244 -17999	N	h-	-1.3888	0.3401	-0.7202	169.7	-	-		
06	-31	0562 Oct 28 03:24:31	5070 -17776	N	a-	-1.3698	0.3747	-0.6852	177.0	-	-		
07	-30	0580 Nov 07 11:37:22	4898 -17553	N	a-	-1.3563	0.3990	-0.6599	181.7	-	-		
08	-29	0598 Nov 18 19:55:27	4726 -17330	N	a-	-1.3461	0.4168	-0.6405	184.8	-	-		
09	-28	0616 Nov 29 04:19:10	4556 -17107	N	a-	-1.3394	0.4281	-0.6271	186.5	-	-		
10	-27	0634 Dec 10 12:44:10	4387 -16884	N	a-	-1.3332	0.4381	-0.6143	187.8	-	-		
11	-26	0652 Dec 20 21:10:19	4220 -16661	N	a-	-1.3269	0.4478	-0.6011	189.0	-	-		
12	-25	0671 Jan 01 05:35:08	4055 -16438	N	a-	-1.3188	0.4607	-0.5841	190.7	-	-		
13	-24	0689 Jan 11 13:58:39	3891 -16215	N	a-	-1.3085	0.4772	-0.5629	193.0	-	-		
14	-23	0707 Jan 22 22:16:17	3730 -15992	N	a-	-1.2927	0.5034	-0.5314	196.9	-	-		
15	-22	0725 Feb 02 06:29:58	3571 -15769	N	a-	-1.2731	0.5366	-0.4926	201.8	-	-		
16	-21	0743 Feb 13 14:36:05	3414 -15546	N	a-	-1.2466	0.5823	-0.4409	208.4	-	-		
17	-20	0761 Feb 23 22:37:07	3260 -15323	N	a-	-1.2151	0.6369	-0.3801	215.8	-	-		
18	-19	0779 Mar 07 06:28:42	3109 -15100	N	a-	-1.1750	0.7072	-0.3034	224.8	-	-		
19	-18	0797 Mar 17 14:15:23	2961 -14877	N	a-	-1.1301	0.7865	-0.2178	234.1	-	-		
20	-17	0815 Mar 28 21:53:31	2816 -14654	N	a-	-1.0774	0.8800	-0.1181	244.1	-	-		
21	-16	0833 Apr 08 05:26:40	2675 -14431	N	a-	-1.0197	0.9828	-0.0092	254.0	-	-		

22	-15	0851	Apr 19	12:52:52	2538	-14208	P	a-	-0.9554	1.0980	0.1116	264.0	74.6	-
23	-14	0869	Apr 29	20:16:05	2404	-13985	P	a-	-0.8876	1.2197	0.2386	273.4	106.9	-
24	-13	0887	May 11	03:34:50	2274	-13762	P	a-	-0.8151	1.3503	0.3739	282.2	130.8	-
25	-12	0905	May 21	10:51:32	2149	-13539	P	a-	-0.7399	1.4862	0.5141	290.2	149.7	-
26	-11	0923	Jun 01	18:07:03	2028	-13316	P	a-	-0.6630	1.6256	0.6571	297.3	165.0	-
27	-10	0941	Jun 12	01:23:11	1911	-13093	P	a-	-0.5857	1.7657	0.8003	303.4	177.3	-
28	-09	0959	Jun 23	08:40:46	1798	-12870	P	a-	-0.5088	1.9056	0.9426	308.4	187.2	-
29	-08	0977	Jul 03	16:00:39	1691	-12647	T	a-	-0.4331	2.0437	1.0824	312.5	195.1	42.6
30	-07	0995	Jul 14	23:25:10	1587	-12424	T	a-	-0.3607	2.1760	1.2159	315.7	201.0	66.0
31	-06	1013	Jul 25	06:54:14	1489	-12201	T	p-	-0.2916	2.3024	1.3429	318.0	205.5	79.5
32	-05	1031	Aug 05	14:28:58	1395	-11978	T-	p-	-0.2270	2.4210	1.4616	319.6	208.6	88.0
33	-04	1049	Aug 15	22:10:32	1305	-11755	T-	p-	-0.1675	2.5304	1.5706	320.6	210.5	93.5
34	-03	1067	Aug 27	05:59:57	1220	-11532	T-	p-	-0.1142	2.6286	1.6680	321.1	211.7	96.7
35	-02	1085	Sep 06	13:57:40	1140	-11309	T-	p-	-0.0677	2.7144	1.7526	321.2	212.1	98.3
36	-01	1103	Sep 17	22:02:58	1064	-11086	T-	pp	-0.0272	2.7894	1.8262	321.1	212.1	98.9
37	00	1121	Sep 28	06:17:30	993	-10863	T+	pp	0.0058	2.8295	1.8648	320.8	211.9	98.9
38	01	1139	Oct 09	14:39:55	925	-10640	T+	pp	0.0327	2.7810	1.8147	320.5	211.4	98.5
39	02	1157	Oct 19	23:10:14	862	-10417	T+	pp	0.0532	2.7440	1.7763	320.1	211.0	97.9
40	03	1175	Oct 31	07:47:11	803	-10194	T+	pp	0.0685	2.7167	1.7476	319.8	210.5	97.4
41	04	1193	Nov 10	16:30:23	747	-9971	T+	p-	0.0789	2.6982	1.7279	319.6	210.2	96.9
42	05	1211	Nov 22	01:18:37	695	-9748	T+	p-	0.0853	2.6867	1.7157	319.4	209.9	96.6
43	06	1229	Dec 02	10:09:23	647	-9525	T+	p-	0.0900	2.6784	1.7070	319.2	209.7	96.3
44	07	1247	Dec 13	19:03:01	601	-9302	T+	p-	0.0924	2.6739	1.7025	319.0	209.6	96.2
45	08	1265	Dec 24	03:55:57	559	-9079	T+	p-	0.0958	2.6675	1.6966	318.9	209.5	96.0
46	09	1284	Jan 04	12:48:12	519	-8856	T+	p-	0.0995	2.6603	1.6903	318.7	209.4	95.9
47	10	1302	Jan 14	21:35:54	482	-8633	T+	p-	0.1072	2.6455	1.6768	318.5	209.3	95.6
48	11	1320	Jan 26	06:20:48	448	-8410	T+	p-	0.1171	2.6265	1.6594	318.3	209.2	95.2
49	12	1338	Feb 05	14:59:11	415	-8187	T+	p-	0.1328	2.5967	1.6315	318.0	208.9	94.5

50	13	1356	Feb 16	23:31:22	385	-7964	T+	-p	0.1535	2.5578	1.5946	317.6	208.5	93.3
51	14	1374	Feb 27	07:55:14	356	-7741	T+	-p	0.1809	2.5063	1.5452	317.0	207.8	91.3
52	15	1392	Mar 09	16:12:14	329	-7518	T+	-p	0.2141	2.4444	1.4854	316.1	206.7	88.4
53	16	1410	Mar 21	00:20:45	303	-7295	T+	-p	0.2544	2.3696	1.4125	315.0	205.0	83.9
54	17	1428	Mar 31	08:21:15	279	-7072	T	-p	0.3013	2.2826	1.3273	313.4	202.5	77.2
55	18	1446	Apr 11	16:14:02	256	-6849	T	-p	0.3545	2.1841	1.2303	311.3	199.1	67.0
56	19	1464	Apr 22	00:00:10	235	-6626	T	-a	0.4130	2.0764	1.1235	308.5	194.6	50.8
57	20	1482	May 03	07:39:00	214	-6403	T	-a	0.4772	1.9582	1.0059	305.0	188.5	11.5
58	21	1500	May 13	15:12:36	195	-6180	P	-a	0.5457	1.8326	0.8802	300.5	180.6	-
59	22	1518	May 24	22:40:54	177	-5957	P	-a	0.6180	1.7002	0.7473	295.0	170.5	-
60	23	1536	Jun 04	06:06:33	161	-5734	P	-a	0.6920	1.5650	0.6109	288.5	157.9	-
61	24	1554	Jun 15	13:27:59	146	-5511	P	-a	0.7688	1.4250	0.4691	280.7	141.8	-
62	25	1572	Jun 25	20:49:39	134	-5288	P	-a	0.8446	1.2872	0.3288	271.9	121.5	-
63	26	1590	Jul 17	04:09:55	123	-5065	P	-a	0.9206	1.1493	0.1879	261.7	93.9	-
64	27	1608	Jul 27	11:33:02	109	-4842	P	-a	0.9936	1.0172	0.0520	250.7	50.5	-
65	28	1626	Aug 07	18:56:24	84	-4619	N	-a	1.0655	0.8874	-0.0820	238.2	-	-
66	29	1644	Aug 18	02:25:18	57	-4396	N	-a	1.1319	0.7679	-0.2062	225.2	-	-
67	30	1662	Aug 29	09:57:01	32	-4173	N	-a	1.1951	0.6546	-0.3247	211.1	-	-
68	31	1680	Sep 08	17:35:19	14	-3950	N	-a	1.2521	0.5527	-0.4320	196.8	-	-
69	32	1698	Sep 20	01:18:39	8	-3727	N	-a	1.3043	0.4598	-0.5308	181.8	-	-
70	33	1716	Oct 01	09:10:11	10	-3504	N	-a	1.3494	0.3802	-0.6163	167.3	-	-
71	34	1734	Oct 12	17:08:05	11	-3281	N	-a	1.3883	0.3117	-0.6908	153.1	-	-
72	35	1752	Oct 23	01:12:56	13	-3058	N	-a	1.4211	0.2545	-0.7539	139.7	-	-
73	36	1770	Nov 03	09:24:30	16	-2835	N	-a	1.4478	0.2085	-0.8057	127.5	-	-
74	37	1788	Nov 13	17:42:36	16	-2612	N	-a	1.4689	0.1725	-0.8471	116.8	-	-
75	38	1806	Nov 26	02:05:38	12	-2389	N	-a	1.4853	0.1450	-0.8797	107.8	-	-
76	39	1824	Dec 06	10:32:41	10	-2166	N	-a	1.4980	0.1241	-0.9053	100.3	-	-
77	40	1842	Dec 17	19:02:29	6	-1943	N	-a	1.5078	0.1082	-0.9253	94.1	-	-

78	41	1860 Dec 28	03:33:54	8	-1720	N	-a	1.5159	0.0950	-0.9419	88.7	-	-
79	42	1879 Jan 08	12:04:10	-5	-1497	N	-a	1.5243	0.0812	-0.9587	82.3	-	-
80	43	1897 Jan 18	20:33:07	-6	-1274	N	-a	1.5332	0.0659	-0.9763	74.5	-	-
81	44	1915 Jan 31	04:57:42	17	-1051	N	-a	1.5450	0.0451	-0.9989	62.0	-	-
82	45	1933 Feb 10	13:17:33	24	-828	N	-a	1.5600	0.0182	-1.0270	39.6	-	-

SAROS SERIES

104

Saros series 104 contains 72 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-38	0483 Aug 04	10:31:02	5843	-18756	N	a-	1.4920	0.0940	-0.8541	81.3	-	-	
02	-37	0501 Aug 14	18:18:54	5667	-18533	N	a-	1.4366	0.1966	-0.7533	116.4	-	-	
03	-36	0519 Aug 26	02:14:07	5489	-18310	N	a-	1.3870	0.2888	-0.6634	139.9	-	-	
04	-35	0537 Sep 05	10:16:09	5314	-18087	N	a-	1.3429	0.3710	-0.5836	157.4	-	-	

05	-34	0555	Sep 16	18:26:52	5139	-17864	N	a-	1.3058	0.4403	-0.5171	170.4	-	-
06	-33	0573	Sep 27	02:44:59	4966	-17641	N	a-	1.2751	0.4981	-0.4621	180.3	-	-
07	-32	0591	Oct 08	11:11:50	4794	-17418	N	a-	1.2514	0.5431	-0.4200	187.6	-	-
08	-31	0609	Oct 18	19:44:15	4623	-17195	N	a-	1.2323	0.5795	-0.3863	193.2	-	-
09	-30	0627	Oct 30	04:24:39	4454	-16972	N	a-	1.2200	0.6034	-0.3649	196.9	-	-
10	-29	0645	Nov 09	13:09:24	4286	-16749	N	a-	1.2114	0.6203	-0.3503	199.5	-	-
11	-28	0663	Nov 20	21:59:12	4120	-16526	N	a-	1.2073	0.6287	-0.3437	200.9	-	-
12	-27	0681	Dec 01	06:50:31	3956	-16303	N	a-	1.2047	0.6342	-0.3397	201.9	-	-
13	-26	0699	Dec 12	15:43:47	3793	-16080	N	a-	1.2041	0.6358	-0.3391	202.3	-	-
14	-25	0717	Dec 23	00:35:34	3633	-15857	N	a-	1.2028	0.6385	-0.3370	202.9	-	-
15	-24	0736	Jan 03	09:25:09	3476	-15634	N	a-	1.2004	0.6431	-0.3326	203.8	-	-
16	-23	0754	Jan 13	18:10:39	3321	-15411	N	a-	1.1951	0.6526	-0.3229	205.4	-	-
17	-22	0772	Jan 25	02:51:28	3168	-15188	N	a-	1.1870	0.6673	-0.3076	207.6	-	-
18	-21	0790	Feb 04	11:24:47	3019	-14965	N	a-	1.1732	0.6922	-0.2819	211.3	-	-
19	-20	0808	Feb 15	19:51:09	2873	-14742	N	a-	1.1543	0.7264	-0.2468	216.0	-	-
20	-19	0826	Feb 26	04:08:47	2730	-14519	N	a-	1.1290	0.7722	-0.1999	222.1	-	-
21	-18	0844	Mar 08	12:19:11	2591	-14296	N	a-	1.0985	0.8278	-0.1435	229.0	-	-
22	-17	0862	Mar 19	20:18:53	2456	-14073	N	a-	1.0598	0.8983	-0.0721	237.4	-	-
23	-16	0880	Mar 30	04:11:45	2325	-13850	P	a-	1.0161	0.9784	0.0084	246.2	20.4	-
24	-15	0898	Apr 10	11:55:02	2198	-13627	P	a-	0.9647	1.0725	0.1027	255.8	70.4	-
25	-14	0916	Apr 20	19:32:10	2075	-13404	P	a-	0.9090	1.1749	0.2049	265.4	98.2	-
26	-13	0934	May 02	03:00:10	1956	-13181	P	a-	0.8463	1.2903	0.3196	275.4	121.0	-
27	-12	0952	May 12	10:23:59	1842	-12958	P	a-	0.7807	1.4113	0.4394	284.9	139.8	-
28	-11	0970	May 23	17:41:28	1733	-12735	P	a-	0.7102	1.5416	0.5678	294.2	156.2	-
29	-10	0988	Jun 03	00:55:42	1627	-12512	P	a-	0.6377	1.6757	0.6996	302.9	170.3	-
30	-09	1006	Jun 14	08:06:25	1527	-12289	P	a-	0.5629	1.8145	0.8354	310.9	182.4	-
31	-08	1024	Jun 24	15:16:44	1431	-12066	P	a-	0.4885	1.9528	0.9702	318.1	192.6	-
32	-07	1042	Jul 05	22:26:38	1340	-11843	T	a-	0.4145	2.0908	1.1039	324.4	201.0	48.5

33	-06	1060	Jul 16	05:37:00	1253	-11620	T	p-	0.3417	2.2267	1.2352	330.0	207.8	70.2
34	-05	1078	Jul 27	12:50:23	1171	-11397	T+	p-	0.2721	2.3570	1.3602	334.7	213.2	83.3
35	-04	1096	Aug 06	20:07:07	1094	-11174	T+	pp	0.2060	2.4812	1.4788	338.6	217.2	91.9
36	-03	1114	Aug 18	03:29:04	1020	-10951	T+	pp	0.1451	2.5959	1.5875	341.9	220.1	97.3
37	-02	1132	Aug 28	10:55:54	951	-10728	T+	pp	0.0890	2.7019	1.6873	344.6	222.1	100.6
38	-01	1150	Sep 08	18:30:27	887	-10505	T+	pp	0.0401	2.7950	1.7740	346.9	223.3	102.1
39	00	1168	Sep 19	02:11:28	826	-10282	T-	pp	-0.0028	2.8668	1.8393	348.8	224.0	102.6
40	01	1186	Sep 30	09:59:19	769	-10059	T-	pp	-0.0392	2.8031	1.7692	350.5	224.4	102.2
41	02	1204	Oct 10	17:54:16	715	-9836	T-	pp	-0.0691	2.7514	1.7113	352.0	224.5	101.4
42	03	1222	Oct 22	01:56:29	665	-9613	T-	pp	-0.0919	2.7126	1.6665	353.4	224.6	100.5
43	04	1240	Nov 01	10:04:27	619	-9390	T-	pp	-0.1096	2.6829	1.6314	354.8	224.7	99.6
44	05	1258	Nov 12	18:16:59	575	-9167	T-	p	-0.1227	2.6615	1.6049	356.2	224.8	98.9
45	06	1276	Nov 23	02:33:30	535	-8944	T-	p	-0.1316	2.6473	1.5863	357.5	225.0	98.3
46	07	1294	Dec 04	10:52:56	497	-8721	T-	p	-0.1372	2.6389	1.5741	358.8	225.3	98.0
47	08	1312	Dec 14	19:11:58	461	-8498	T-	p	-0.1424	2.6309	1.5630	360.0	225.7	97.7
48	09	1330	Dec 26	03:30:41	428	-8275	T-	p	-0.1471	2.6236	1.5532	361.1	226.0	97.5
49	10	1349	Jan 05	11:45:40	397	-8052	T-	p	-0.1541	2.6116	1.5395	362.1	226.3	97.1
50	11	1367	Jan 16	19:57:34	367	-7829	T-	p	-0.1629	2.5959	1.5227	362.9	226.5	96.5
51	12	1385	Jan 27	04:01:25	339	-7606	T-	p	-0.1775	2.5694	1.4957	363.5	226.5	95.3
52	13	1403	Feb 07	12:00:03	313	-7383	T-	p	-0.1958	2.5359	1.4622	363.8	226.2	93.6
53	14	1421	Feb 17	19:48:27	289	-7160	T-	p	-0.2216	2.4882	1.4150	363.8	225.4	90.6
54	15	1439	Mar 01	03:28:54	265	-6937	T-	p	-0.2536	2.4292	1.3568	363.4	224.1	86.2
55	16	1457	Mar 11	10:57:52	243	-6714	T	p	-0.2944	2.3538	1.2823	362.4	221.9	79.1
56	17	1475	Mar 22	18:18:39	222	-6491	T	t	-0.3413	2.2673	1.1969	360.8	218.7	68.2
57	18	1493	Apr 02	01:28:34	203	-6268	T	t	-0.3964	2.1656	1.0963	358.3	214.0	49.5
58	19	1511	Apr 13	08:29:06	184	-6045	P	t	-0.4585	2.0510	0.9828	354.7	207.5	-
59	20	1529	Apr 23	15:20:28	167	-5822	P	t	-0.5277	1.9238	0.8563	349.9	198.6	-
60	21	1547	May 04	22:04:32	152	-5599	P	t	-0.6022	1.7866	0.7198	343.7	186.8	-

61	22	1565	May 15	04:41:16	138	-5376	P	-t	-0.6820	1.6400	0.5736	335.7	171.1	-
62	23	1583	Jun 05	11:12:22	127	-5153	P	-t	-0.7655	1.4867	0.4203	325.9	150.3	-
63	24	1601	Jun 15	17:39:34	117	-4930	P	-t	-0.8517	1.3287	0.2621	314.1	121.7	-
64	25	1619	Jun 27	00:04:48	95	-4707	P	-t	-0.9389	1.1690	0.1017	300.2	77.7	-
65	26	1637	Jul 07	06:28:09	68	-4484	Nx	-t	-1.0270	1.0079	-0.0604	283.9	-	-
66	27	1655	Jul 18	12:53:09	41	-4261	N	-t	-1.1131	0.8506	-0.2192	265.4	-	-
67	28	1673	Jul 28	19:20:13	20	-4038	N	-t	-1.1971	0.6975	-0.3740	244.2	-	-
68	29	1691	Aug 09	01:52:19	9	-3815	N	-t	-1.2766	0.5526	-0.5210	220.6	-	-
69	30	1709	Aug 20	08:27:54	9	-3592	N	-t	-1.3529	0.4137	-0.6622	193.5	-	-
70	31	1727	Aug 31	15:12:00	10	-3369	N	-t	-1.4223	0.2878	-0.7907	163.4	-	-
71	32	1745	Sep 10	22:02:28	12	-3146	N	-t	-1.4863	0.1716	-0.9095	127.5	-	-
72	33	1763	Sep 22	05:02:59	15	-2923	N	-t	-1.5421	0.0706	-1.0131	82.5	-	-

SAROS SERIES

105

Saros series 105 contains 73 lunar eclipses.

PHASE													
DURATIONS													
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL

NUM.	NUM.	DATE	OF	s	NUM	TYPE	MAG.	MAG.	m	m	m
GREATEST											
ECLIPSE											
01	-34	0566 Aug 16 19:12:38	5034 -17729	Nb	t-	-1.5296 0.0708 -0.9678	78.6	-	-	-	-
02	-33	0584 Aug 27 02:28:31	4861 -17506	N	t-	-1.4809 0.1633 -0.8815	119.0	-	-	-	-
03	-32	0602 Sep 07 09:51:15	4690 -17283	N	t-	-1.4381 0.2450 -0.8062	145.3	-	-	-	-
04	-31	0620 Sep 17 17:20:56	4520 -17060	N	t-	-1.4012 0.3157 -0.7417	164.6	-	-	-	-
05	-30	0638 Sep 29 00:58:43	4352 -16837	N	t-	-1.3712 0.3739 -0.6897	178.9	-	-	-	-
06	-29	0656 Oct 09 08:43:47	4185 -16614	N	t-	-1.3473 0.4208 -0.6486	189.7	-	-	-	-
07	-28	0674 Oct 20 16:36:37	4020 -16391	N	t-	-1.3301 0.4550 -0.6198	197.4	-	-	-	-
08	-27	0692 Oct 31 00:33:45	3857 -16168	N	t-	-1.3168 0.4818 -0.5979	203.3	-	-	-	-
09	-26	0710 Nov 11 08:37:48	3696 -15945	N	t-	-1.3094 0.4976 -0.5863	207.0	-	-	-	-
10	-25	0728 Nov 21 16:44:17	3537 -15722	N	t-	-1.3041 0.5092 -0.5784	209.8	-	-	-	-
11	-24	0746 Dec 03 00:53:43	3381 -15499	N	t-	-1.3017 0.5150 -0.5753	211.4	-	-	-	-
12	-23	0764 Dec 13 09:01:39	3228 -15276	N	t-	-1.2984 0.5220 -0.5704	213.2	-	-	-	-
13	-22	0782 Dec 24 17:09:39	3078 -15053	N	t-	-1.2956 0.5279 -0.5658	214.7	-	-	-	-
14	-21	0801 Jan 04 01:13:24	2930 -14830	N	t-	-1.2895 0.5393 -0.5550	217.2	-	-	-	-
15	-20	0819 Jan 15 09:12:36	2786 -14607	N	t-	-1.2802 0.5564 -0.5377	220.6	-	-	-	-
16	-19	0837 Jan 25 17:04:56	2646 -14384	N	t-	-1.2655 0.5830 -0.5103	225.5	-	-	-	-
17	-18	0855 Feb 06 00:50:13	2509 -14161	N	t-	-1.2454 0.6191 -0.4728	231.8	-	-	-	-
18	-17	0873 Feb 16 08:26:20	2376 -13938	N	t-	-1.2181 0.6683 -0.4218	239.9	-	-	-	-
19	-16	0891 Feb 27 15:53:21	2248 -13715	N	t-	-1.1834 0.7308 -0.3572	249.4	-	-	-	-
20	-15	0909 Mar 09 23:10:48	2123 -13492	N	t-	-1.1411 0.8073 -0.2782	260.3	-	-	-	-
21	-14	0927 Mar 21 06:19:21	2003 -13269	N	t-	-1.0915 0.8970 -0.1860	271.9	-	-	-	-
22	-13	0945 Mar 31 13:17:13	1887 -13046	Nx	t-	-1.0333 1.0026 -0.0779	284.3	-	-	-	-
23	-12	0963 Apr 11 20:07:31	1775 -12823	P	t-	-0.9689 1.1195 0.0416	296.7	50.2	-	-	-
24	-11	0981 Apr 22 02:48:48	1668 -12600	P	t-	-0.8971 1.2500 0.1745	309.0	100.9	-	-	-
25	-10	0999 May 03 09:24:58	1566 -12377	P	t-	-0.8206 1.3892 0.3159	320.6	132.9	-	-	-

26	-09	1017	May 13	15:53:23	1468	-12154	P	t-	-0.7377	1.5403	0.4689	331.5	158.2	-
27	-08	1035	May 24	22:19:50	1375	-11931	P	t-	-0.6530	1.6949	0.6251	341.1	178.0	-
28	-07	1053	Jun 04	04:42:18	1287	-11708	P	t-	-0.5650	1.8558	0.7872	349.5	194.3	-
29	-06	1071	Jun 15	11:05:23	1203	-11485	P	t-	-0.4770	2.0168	0.9491	356.5	207.1	-
30	-05	1089	Jun 25	17:27:45	1124	-11262	T	t-	-0.3880	2.1799	1.1127	362.2	217.1	53.8
31	-04	1107	Jul 06	23:54:10	1049	-11039	T	t-	-0.3018	2.3381	1.2710	366.4	224.5	78.9
32	-03	1125	Jul 17	06:23:50	978	-10816	T	pp	-0.2180	2.4920	1.4247	369.3	229.5	93.0
33	-02	1143	Jul 28	12:59:07	912	-10593	T	pp	-0.1382	2.6385	1.5707	370.9	232.6	101.0
34	-01	1161	Aug 07	19:41:17	849	-10370	T	pp	-0.0637	2.7758	1.7071	371.6	234.1	104.9
35	00	1179	Aug 19	02:31:51	791	-10147	T+	pp	0.0045	2.8847	1.8151	371.4	234.1	105.7
36	01	1197	Aug 29	09:31:59	736	-9924	T+	pp	0.0655	2.7734	1.7026	370.6	233.1	104.3
37	02	1215	Sep 09	16:40:52	685	-9701	T+	pp	0.1199	2.6742	1.6022	369.2	231.5	101.4
38	03	1233	Sep 20	00:00:52	637	-9478	T+	pp	0.1657	2.5909	1.5176	367.7	229.4	97.5
39	04	1251	Oct 01	07:29:58	592	-9255	T+	pp	0.2045	2.5202	1.4459	365.9	227.2	93.1
40	05	1269	Oct 11	15:09:34	550	-9032	T+	pp	0.2354	2.4639	1.3888	364.2	225.0	88.8
41	06	1287	Oct 22	22:57:41	511	-8809	T+	pp	0.2599	2.4193	1.3436	362.5	223.0	84.8
42	07	1305	Nov 02	06:55:19	475	-8586	T	-p	0.2773	2.3874	1.3116	361.0	221.3	81.5
43	08	1323	Nov 13	14:59:35	441	-8363	T	-p	0.2897	2.3643	1.2890	359.6	220.0	79.0
44	09	1341	Nov 23	23:09:48	409	-8140	T	-p	0.2980	2.3486	1.2744	358.2	218.9	77.2
45	10	1359	Dec 05	07:24:19	379	-7917	T	-p	0.3034	2.3378	1.2653	356.9	218.0	76.0
46	11	1377	Dec 15	15:42:20	350	-7694	T	-p	0.3069	2.3302	1.2601	355.5	217.3	75.2
47	12	1395	Dec 27	00:00:15	324	-7471	T	-p	0.3111	2.3209	1.2539	354.1	216.5	74.4
48	13	1414	Jan 06	08:17:53	298	-7248	T	-p	0.3163	2.3096	1.2463	352.5	215.7	73.3
49	14	1432	Jan 17	16:32:40	274	-7025	T	-p	0.3247	2.2918	1.2331	350.6	214.6	71.5
50	15	1450	Jan 28	00:45:08	252	-6802	T	-p	0.3360	2.2686	1.2148	348.5	213.2	69.0
51	16	1468	Feb 08	08:50:31	230	-6579	T	-p	0.3539	2.2330	1.1847	346.0	211.3	64.5
52	17	1486	Feb 18	16:51:51	210	-6356	T	-p	0.3760	2.1895	1.1471	343.1	209.0	58.2
53	18	1504	Mar 01	00:44:47	191	-6133	T	-p	0.4057	2.1318	1.0956	339.7	205.8	47.6

54	19	1522	Mar 12	08:32:37	174	-5910	T	-t	0.4404	2.0648	1.0350	335.8	201.8	29.3	
55	20	1540	Mar 22	16:11:08	158	-5687	P	-t	0.4838	1.9821	0.9587	331.0	196.4	-	
56	21	1558	Apr 02	23:45:10	144	-5464	P	-t	0.5316	1.8911	0.8741	325.6	189.8	-	
57	22	1576	Apr 13	07:11:16	131	-5241	P	-t	0.5865	1.7871	0.7763	319.2	181.4	-	
58	23	1594	May 04	14:32:42	121	-5018	P	-t	0.6461	1.6748	0.6699	311.9	171.0	-	
59	24	1612	May 14	21:48:17	104	-4795	P	-t	0.7111	1.5527	0.5534	303.4	157.9	-	
60	25	1630	May 26	05:01:22	79	-4572	P	-h	0.7788	1.4259	0.4318	293.7	141.7	-	
61	26	1648	Jun 05	12:11:39	51	-4349	P	-h	0.8497	1.2935	0.3041	282.8	120.8	-	
62	27	1666	Jun 16	19:20:41	27	-4126	P	-h	0.9222	1.1584	0.1732	270.5	92.6	-	
63	28	1684	Jun 27	02:30:11	11	-3903	P	-h	0.9948	1.0233	0.0416	257.0	46.1	-	
64	29	1702	Jul 09	09:41:33	8	-3680	N	-h	1.0664	0.8904	-0.0883	242.1	-	-	
65	30	1720	Jul 19	16:55:34	10	-3457	N	-a	1.1366	0.7604	-0.2159	225.9	-	-	
66	31	1738	Jul 31	00:13:25	11	-3234	N	-a	1.2043	0.6353	-0.3392	208.4	-	-	
67	32	1756	Aug 10	07:36:47	14	-3011	N	-a	1.2682	0.5174	-0.4558	189.6	-	-	
68	33	1774	Aug 21	15:06:39	16	-2788	N	-a	1.3271	0.4089	-0.5635	169.8	-	-	
69	34	1792	Aug 31	22:42:42	16	-2565	N	-a	1.3816	0.3086	-0.6634	148.5	-	-	
70	35	1810	Sep 13	06:27:11	12	-2342	N	-a	1.4299	0.2202	-0.7520	126.2	-	-	
71	36	1828	Sep 23	14:19:43	8	-2119	N	-a	1.4724	0.1424	-0.8302	102.0	-	-	
72	37	1846	Oct 04	22:21:39	6	-1896	N	-a	1.5077	0.0779	-0.8954	75.7	-	-	
73	38	1864	Oct 15	06:30:47	6	-1673	N	-a	1.5379	0.0228	-0.9512	41.1	-	-	

SAROS SERIES

Saros series 106 contains 73 lunar eclipses.

PHASE													
DURATIONS													
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-35	0595 Jul 27 01:33:13	4758 -17371	Nb t-	1.5221	0.0900 -0.9596	90.2	-	-				
02	-34	0613 Aug 06 08:29:10	4587 -17148	N t-	1.4514	0.2195 -0.8298	138.8	-	-				
03	-33	0631 Aug 17 15:33:22	4418 -16925	N t-	1.3860	0.3395 -0.7097	170.3	-	-				
04	-32	0649 Aug 27 22:47:19	4251 -16702	N t-	1.3270	0.4478 -0.6015	193.0	-	-				
05	-31	0667 Sep 08 06:11:10	4085 -16479	N t-	1.2749	0.5435 -0.5061	210.1	-	-				
06	-30	0685 Sep 18 13:46:00	3921 -16256	N h-	1.2307	0.6248 -0.4250	222.9	-	-				
07	-29	0703 Sep 29 21:30:42	3759 -16033	N h-	1.1934	0.6934 -0.3566	232.5	-	-				
08	-28	0721 Oct 10 05:25:14	3600 -15810	N a-	1.1632	0.7487 -0.3012	239.6	-	-				
09	-27	0739 Oct 21 13:28:49	3443 -15587	N a-	1.1394	0.7922 -0.2574	244.6	-	-				
10	-26	0757 Oct 31 21:41:14	3288 -15364	N a-	1.1221	0.8235 -0.2253	247.9	-	-				
11	-25	0775 Nov 12 05:59:14	3137 -15141	N a-	1.1088	0.8474 -0.2002	250.0	-	-				
12	-24	0793 Nov 22 14:23:41	2988 -14918	N a-	1.1000	0.8626 -0.1832	251.0	-	-				
13	-23	0811 Dec 03 22:51:00	2843 -14695	N a-	1.0931	0.8741 -0.1694	251.5	-	-				
14	-22	0829 Dec 14 07:21:21	2701 -14472	N a-	1.0879	0.8822 -0.1583	251.5	-	-				
15	-21	0847 Dec 25 15:50:18	2563 -14249	N a-	1.0809	0.8933 -0.1436	251.9	-	-				
16	-20	0866 Jan 05 00:19:44	2428 -14026	N a-	1.0736	0.9044 -0.1283	252.1	-	-				
17	-19	0884 Jan 16 08:45:25	2298 -13803	N a-	1.0630	0.9215 -0.1064	253.0	-	-				

18	-18	0902	Jan 26	17:07:20	2172	-13580	N	a-	1.0483	0.9458	-0.0769	254.6	-	-
19	-17	0920	Feb 07	01:22:57	2050	-13357	N	a-	1.0279	0.9805	-0.0366	257.2	-	-
20	-16	0938	Feb 17	09:33:20	1932	-13134	P	a-	1.0023	1.0244	0.0133	260.6	26.3	-
21	-15	0956	Feb 28	17:36:42	1819	-12911	P	a-	0.9704	1.0799	0.0748	264.8	61.7	-
22	-14	0974	Mar 11	01:32:38	1710	-12688	P	a-	0.9317	1.1478	0.1489	269.7	85.9	-
23	-13	0992	Mar 21	09:21:55	1606	-12465	P	a-	0.8867	1.2273	0.2344	275.3	106.2	-
24	-12	1010	Apr 01	17:04:25	1506	-12242	P	a-	0.8352	1.3188	0.3319	281.2	124.2	-
25	-11	1028	Apr 12	00:40:17	1412	-12019	P	a-	0.7775	1.4218	0.4405	287.3	140.4	-
26	-10	1046	Apr 23	08:10:38	1321	-11796	P	a-	0.7145	1.5347	0.5587	293.3	154.8	-
27	-09	1064	May 03	15:36:35	1236	-11573	P	a-	0.6470	1.6562	0.6850	298.9	167.5	-
28	-08	1082	May 14	22:59:40	1155	-11350	P	a-	0.5763	1.7838	0.8169	304.1	178.5	-
29	-07	1100	May 25	06:19:17	1078	-11127	P	a-	0.5017	1.9186	0.9556	308.8	188.0	-
30	-06	1118	Jun 05	13:39:05	1005	-10904	T	a-	0.4266	2.0549	1.0950	312.7	195.7	45.5
31	-05	1136	Jun 15	20:58:24	937	-10681	T	a-	0.3500	2.1941	1.2368	315.8	201.9	68.6
32	-04	1154	Jun 27	04:20:08	873	-10458	T	p-	0.2750	2.3309	1.3754	318.1	206.5	82.2
33	-03	1172	Jul 07	11:43:06	813	-10235	T+	p-	0.2002	2.4674	1.5132	319.8	209.8	91.1
34	-02	1190	Jul 18	19:11:31	757	-10012	T+	p-	0.1293	2.5972	1.6436	320.6	211.8	96.3
35	-01	1208	Jul 29	02:44:05	704	-9789	T+	pp	0.0611	2.7223	1.7688	320.9	212.8	99.0
36	00	1226	Aug 09	10:22:59	655	-9566	T-	pp	-0.0021	2.8309	1.8770	320.6	212.8	99.6
37	01	1244	Aug 19	18:08:09	609	-9343	T-	pp	-0.0604	2.7243	1.7694	320.0	212.0	98.7
38	02	1262	Aug 31	02:01:40	566	-9120	T-	pp	-0.1120	2.6303	1.6741	319.1	210.8	96.5
39	03	1280	Sep 10	10:02:47	526	-8897	T-	p-	-0.1577	2.5474	1.5895	318.0	209.2	93.5
40	04	1298	Sep 21	18:11:08	489	-8674	T-	p-	-0.1975	2.4751	1.5155	316.9	207.5	90.0
41	05	1316	Oct 02	02:28:20	454	-8451	T-	p-	-0.2301	2.4164	1.4547	315.8	205.8	86.5
42	06	1334	Oct 13	10:52:55	421	-8228	T-	p-	-0.2565	2.3690	1.4053	314.9	204.2	83.1
43	07	1352	Oct 23	19:25:34	390	-8005	T	p-	-0.2765	2.3333	1.3677	314.2	202.9	80.2
44	08	1370	Nov 04	04:03:32	361	-7782	T	p-	-0.2920	2.3057	1.3383	313.6	201.8	77.6
45	09	1388	Nov 14	12:48:27	334	-7559	T	p-	-0.3020	2.2882	1.3193	313.2	201.1	75.9

46	10	1406 Nov 25 21:36:51	308	-7336	T	-p	-0.3091	2.2757	1.3057	313.0	200.6	74.6
47	11	1424 Dec 06 06:28:42	284	-7113	T	-p	-0.3134	2.2682	1.2975	312.9	200.3	73.7
48	12	1442 Dec 17 15:21:21	261	-6890	T	-p	-0.3170	2.2617	1.2906	312.8	200.0	73.1
49	13	1460 Dec 28 00:14:45	239	-6667	T	-p	-0.3200	2.2561	1.2851	312.7	199.9	72.5
50	14	1479 Jan 08 09:05:26	218	-6444	T	-p	-0.3253	2.2462	1.2757	312.6	199.6	71.6
51	15	1497 Jan 18 17:53:14	199	-6221	T	-p	-0.3330	2.2315	1.2619	312.3	199.2	70.2
52	16	1515 Jan 30 02:35:56	181	-5998	T	-p	-0.3447	2.2094	1.2410	311.9	198.5	67.8
53	17	1533 Feb 09 11:13:52	164	-5775	T	-p	-0.3602	2.1804	1.2134	311.2	197.6	64.5
54	18	1551 Feb 20 19:43:12	149	-5552	T	-p	-0.3827	2.1382	1.1729	310.3	196.0	58.9
55	19	1569 Mar 03 04:06:08	136	-5329	T	-a	-0.4104	2.0865	1.1228	308.9	193.9	50.5
56	20	1587 Mar 24 12:19:48	125	-5106	T	-a	-0.4456	2.0211	1.0591	307.1	190.8	35.7
57	21	1605 Apr 03 20:27:02	113	-4883	P	-a	-0.4858	1.9467	0.9861	304.8	186.9	-
58	22	1623 Apr 15 04:23:33	89	-4660	P	-a	-0.5345	1.8566	0.8972	301.6	181.4	-
59	23	1641 Apr 25 12:14:36	62	-4437	P	-a	-0.5876	1.7588	0.8003	297.8	174.6	-
60	24	1659 May 06 19:56:13	36	-4214	P	-a	-0.6484	1.6470	0.6890	292.8	165.3	-
61	25	1677 May 17 03:32:58	16	-3991	P	-a	-0.7127	1.5290	0.5710	286.8	153.7	-
62	26	1695 May 28 11:01:57	8	-3768	P	-a	-0.7830	1.4003	0.4417	279.3	138.2	-
63	27	1713 Jun 08 18:28:15	9	-3545	P	-a	-0.8551	1.2685	0.3089	270.6	118.1	-
64	28	1731 Jun 20 01:49:42	11	-3322	P	-a	-0.9307	1.1306	0.1692	260.2	89.4	-
65	29	1749 Jun 30 09:09:16	13	-3099	P	-a	-1.0073	0.9913	0.0276	248.2	36.9	-
66	30	1767 Jul 11 16:27:13	16	-2876	N	-a	-1.0845	0.8511	-0.1155	234.2	-	-
67	31	1785 Jul 21 23:45:46	17	-2653	N	-a	-1.1605	0.7134	-0.2568	218.2	-	-
68	32	1803 Aug 03 07:05:09	12	-2430	N	-a	-1.2349	0.5790	-0.3953	200.0	-	-
69	33	1821 Aug 13 14:26:43	11	-2207	N	-a	-1.3066	0.4497	-0.5292	179.2	-	-
70	34	1839 Aug 24 21:52:11	5	-1984	N	-a	-1.3743	0.3281	-0.6560	155.5	-	-
71	35	1857 Sep 04 05:22:14	7	-1761	N	-a	-1.4376	0.2148	-0.7748	127.6	-	-
72	36	1875 Sep 15 12:57:27	-4	-1538	N	-a	-1.4955	0.1115	-0.8839	93.2	-	-
73	37	1893 Sep 25 20:39:00	-6	-1315	Ne	-a	-1.5476	0.0190	-0.9825	38.9	-	-

SAROS SERIES

107

Saros series 107 contains 72 lunar eclipses.

PHASE													
DURATIONS													
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-37	0606 Jun 26 00:11:01	4654 -17236	Nb	a-	-1.5278	0.0256	-0.9169	42.6	-	-		
02	-36	0624 Jul 06 07:40:28	4485 -17013	N	a-	-1.4581	0.1535	-0.7893	103.2	-	-		
03	-35	0642 Jul 17 15:12:29	4317 -16790	N	a-	-1.3904	0.2783	-0.6653	137.3	-	-		
04	-34	0660 Jul 27 22:50:41	4150 -16567	N	a-	-1.3273	0.3947	-0.5504	161.7	-	-		
05	-33	0678 Aug 08 06:33:10	3986 -16344	N	a-	-1.2677	0.5051	-0.4419	181.0	-	-		
06	-32	0696 Aug 18 14:23:54	3823 -16121	N	a-	-1.2148	0.6034	-0.3461	196.0	-	-		
07	-31	0714 Aug 29 22:20:25	3662 -15898	N	a-	-1.1668	0.6929	-0.2594	208.3	-	-		
08	-30	0732 Sep 09 06:25:00	3504 -15675	N	a-	-1.1257	0.7699	-0.1855	218.1	-	-		
09	-29	0750 Sep 20 14:36:38	3349 -15452	N	a-	-1.0904	0.8363	-0.1224	226.0	-	-		

10	-28	0768	Sep 30	22:57:01	3196	-15229	N	a-	-1.0625	0.8892	-0.0728	232.0	-	-
11	-27	0786	Oct 12	07:24:09	3046	-15006	N	a-	-1.0406	0.9310	-0.0343	236.7	-	-
12	-26	0804	Oct 22	15:58:05	2900	-14783	N	a-	-1.0245	0.9622	-0.0063	240.1	-	-
13	-25	0822	Nov 03	00:38:02	2756	-14560	P	a-	-1.0137	0.9835	0.0120	242.6	23.9	-
14	-24	0840	Nov 13	09:23:17	2617	-14337	P	a-	-1.0074	0.9964	0.0224	244.2	32.6	-
15	-23	0858	Nov 24	18:11:30	2481	-14114	P	a-	-1.0038	1.0040	0.0277	245.4	36.3	-
16	-22	0876	Dec 05	03:02:18	2349	-13891	P	a-	-1.0027	1.0071	0.0290	246.1	37.1	-
17	-21	0894	Dec 16	11:53:12	2221	-13668	P	a-	-1.0018	1.0093	0.0298	246.7	37.7	-
18	-20	0912	Dec 26	20:43:53	2097	-13445	P	a-	-1.0012	1.0109	0.0305	247.3	38.2	-
19	-19	0931	Jan 07	05:30:34	1978	-13222	P	a-	-0.9976	1.0178	0.0368	248.4	42.0	-
20	-18	0949	Jan 17	14:14:23	1863	-12999	P	a-	-0.9921	1.0280	0.0470	249.8	47.5	-
21	-17	0967	Jan 28	22:51:32	1752	-12776	P	a-	-0.9814	1.0474	0.0666	252.1	56.5	-
22	-16	0985	Feb 08	07:22:35	1646	-12553	P	a-	-0.9665	1.0746	0.0943	255.1	67.1	-
23	-15	1003	Feb 19	15:44:36	1545	-12330	P	a-	-0.9446	1.1145	0.1347	259.2	79.9	-
24	-14	1021	Mar 01	23:59:24	1448	-12107	P	a-	-0.9175	1.1639	0.1848	264.0	93.1	-
25	-13	1039	Mar 13	08:04:49	1356	-11884	P	a-	-0.8831	1.2268	0.2482	269.8	107.2	-
26	-12	1057	Mar 23	16:01:00	1269	-11661	P	a-	-0.8419	1.3021	0.3240	276.2	121.5	-
27	-11	1075	Apr 03	23:48:09	1186	-11438	P	a-	-0.7940	1.3900	0.4119	283.3	135.6	-
28	-10	1093	Apr 14	07:26:59	1108	-11215	P	a-	-0.7400	1.4892	0.5109	290.7	149.2	-
29	-09	1111	Apr 25	14:58:17	1033	-10992	P	a-	-0.6802	1.5991	0.6202	298.2	162.0	-
30	-08	1129	May 05	22:21:39	964	-10769	P	a-	-0.6146	1.7200	0.7401	305.7	174.1	-
31	-07	1147	May 17	05:39:50	898	-10546	P	a-	-0.5454	1.8480	0.8664	312.8	184.9	-
32	-06	1165	May 27	12:52:52	837	-10323	P	a-	-0.4727	1.9823	0.9986	319.5	194.5	-
33	-05	1183	Jun 07	20:01:59	779	-10100	T	p-	-0.3976	2.1216	1.1352	325.6	202.7	54.8
34	-04	1201	Jun 18	03:08:28	725	-9877	T	p-	-0.3208	2.2641	1.2744	331.0	209.6	74.8
35	-03	1219	Jun 29	10:13:47	674	-9654	T-	pp	-0.2440	2.4069	1.4133	335.6	215.1	87.6
36	-02	1237	Jul 09	17:19:45	627	-9431	T-	pp	-0.1686	2.5476	1.5495	339.4	219.1	95.8
37	-01	1255	Jul 21	00:25:59	583	-9208	T-	pp	-0.0945	2.6862	1.6831	342.5	221.8	100.7

38	00	1273	Jul 31	07:35:52	542	-8985	T-	pp	-0.0244	2.8175	1.8090	344.8	223.3	102.8
39	01	1291	Aug 11	14:49:05	503	-8762	T+	pp	0.0418	2.7884	1.7741	346.5	223.8	102.6
40	02	1309	Aug 21	22:08:01	467	-8539	T+	pp	0.1025	2.6801	1.6598	347.7	223.4	100.5
41	03	1327	Sep 02	05:31:42	434	-8316	T+	-p	0.1582	2.5811	1.5545	348.5	222.3	96.8
42	04	1345	Sep 12	13:02:48	402	-8093	T+	-p	0.2067	2.4953	1.4623	349.0	220.8	92.0
43	05	1363	Sep 23	20:40:23	372	-7870	T+	-p	0.2489	2.4211	1.3816	349.4	219.0	86.5
44	06	1381	Oct 04	04:24:45	344	-7647	T	-p	0.2847	2.3587	1.3129	349.8	217.2	80.5
45	07	1399	Oct 15	12:16:35	318	-7424	T	-p	0.3135	2.3089	1.2570	350.3	215.6	74.5
46	08	1417	Oct 25	20:15:07	293	-7201	T	-p	0.3364	2.2698	1.2122	350.8	214.2	68.9
47	09	1435	Nov 06	04:20:16	270	-6978	T	-a	0.3529	2.2421	1.1792	351.5	213.2	64.2
48	10	1453	Nov 16	12:28:47	247	-6755	T	-a	0.3661	2.2202	1.1526	352.3	212.5	59.9
49	11	1471	Nov 27	20:42:22	226	-6532	T	-a	0.3745	2.2070	1.1352	353.2	212.1	56.8
50	12	1489	Dec 08	04:57:05	206	-6309	T	-a	0.3817	2.1954	1.1202	354.1	211.8	53.9
51	13	1507	Dec 19	13:13:01	188	-6086	T	-a	0.3872	2.1868	1.1089	354.9	211.7	51.6
52	14	1525	Dec 29	21:26:19	170	-5863	T	-a	0.3944	2.1746	1.0947	355.6	211.4	48.4
53	15	1544	Jan 10	05:37:51	155	-5640	T	-h	0.4024	2.1605	1.0793	356.0	211.0	44.6
54	16	1562	Jan 20	13:43:40	141	-5417	T	-t	0.4147	2.1384	1.0565	356.1	210.1	38.0
55	17	1580	Jan 31	21:43:39	129	-5194	T	-t	0.4311	2.1083	1.0264	355.8	208.7	26.3
56	18	1598	Feb 21	05:35:27	119	-4971	P	-t	0.4537	2.0666	0.9851	355.0	206.5	-
57	19	1616	Mar 03	13:19:28	99	-4748	P	-t	0.4820	2.0142	0.9335	353.5	203.4	-
58	20	1634	Mar 14	20:53:01	73	-4525	P	-t	0.5184	1.9468	0.8674	351.1	198.8	-
59	21	1652	Mar 25	04:17:30	46	-4302	P	-t	0.5617	1.8667	0.7887	347.9	192.6	-
60	22	1670	Apr 05	11:31:33	23	-4079	P	-t	0.6128	1.7720	0.6956	343.4	184.1	-
61	23	1688	Apr 15	18:37:21	10	-3856	P	-t	0.6703	1.6657	0.5908	337.7	173.0	-
62	24	1706	Apr 28	01:31:45	9	-3633	P	-t	0.7365	1.5436	0.4702	330.2	157.6	-
63	25	1724	May 08	08:19:43	10	-3410	P	-t	0.8072	1.4131	0.3411	321.0	137.1	-
64	26	1742	May 19	14:58:37	12	-3187	P	-t	0.8845	1.2706	0.1998	309.6	107.2	-
65	27	1760	May 29	21:33:40	14	-2964	P	-t	0.9647	1.1231	0.0532	296.0	56.6	-

66	28	1778 Jun 10 04:01:09	17	-2741	N	-t	1.0501	0.9660	-0.1034	279.3	-	-
67	29	1796 Jun 20 10:28:08	15	-2518	N	-t	1.1354	0.8095	-0.2597	259.9	-	-
68	30	1814 Jul 02 16:51:30	12	-2295	N	-t	1.2225	0.6498	-0.4196	236.7	-	-
69	31	1832 Jul 12 23:15:58	6	-2072	N	-t	1.3081	0.4929	-0.5769	209.3	-	-
70	32	1850 Jul 24 05:40:16	7	-1849	N	-t	1.3933	0.3371	-0.7337	175.7	-	-
71	33	1868 Aug 03 12:09:13	2	-1626	N	-t	1.4740	0.1894	-0.8825	133.5	-	-
72	34	1886 Aug 14 18:42:04	-6	-1403	Ne	-t	1.5511	0.0489	-1.0246	68.6	-	-

SAROS SERIES

108

Saros series 108 contains 72 lunar eclipses.

													PHASE	
													DURATIONS	
	SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
	NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST														
ECLIPSE														
01	-34	0689 Jul 08 09:04:39	3887	-16209	Nb t-	1.5561	0.0165	-1.0111	37.9	-	-			
02	-33	0707 Jul 19 15:57:32	3726	-15986	N t-	1.4877	0.1446	-0.8881	111.6	-	-			

03	-32	0725 Jul 29 22:53:00	3566 -15763	N t-	1.4218	0.2682	-0.7699	151.0	-	-
04	-31	0743 Aug 10 05:54:17	3410 -15540	N t-	1.3608	0.3830	-0.6608	179.3	-	-
05	-30	0761 Aug 20 12:59:01	3256 -15317	N t-	1.3031	0.4919	-0.5578	202.0	-	-
06	-29	0779 Aug 31 20:12:04	3105 -15094	N t-	1.2523	0.5882	-0.4676	219.8	-	-
07	-28	0797 Sep 11 03:30:50	2957 -14871	N t-	1.2065	0.6753	-0.3866	234.5	-	-
08	-27	0815 Sep 22 10:58:23	2813 -14648	N t-	1.1683	0.7485	-0.3194	246.1	-	-
09	-26	0833 Oct 02 18:32:17	2671 -14425	N t-	1.1356	0.8114	-0.2622	255.6	-	-
10	-25	0851 Oct 14 02:15:28	2534 -14202	N t-	1.1107	0.8597	-0.2193	262.7	-	-
11	-24	0869 Oct 24 10:04:36	2400 -13979	N t-	1.0909	0.8985	-0.1854	268.4	-	-
12	-23	0887 Nov 04 17:59:53	2271 -13756	N t-	1.0765	0.9273	-0.1611	272.7	-	-
13	-22	0905 Nov 15 02:00:01	2146 -13533	N t-	1.0662	0.9481	-0.1441	275.9	-	-
14	-21	0923 Nov 26 10:04:30	2024 -13310	N t-	1.0602	0.9605	-0.1346	278.0	-	-
15	-20	0941 Dec 06 18:10:10	1908 -13087	N t-	1.0551	0.9711	-0.1263	279.8	-	-
16	-19	0959 Dec 18 02:15:57	1795 -12864	N t-	1.0504	0.9804	-0.1185	281.4	-	-
17	-18	0977 Dec 28 10:20:09	1688 -12641	N t-	1.0448	0.9910	-0.1086	283.0	-	-
18	-17	0996 Jan 08 18:21:43	1585 -12418	Nx t-	1.0376	1.0043	-0.0952	284.9	-	-
19	-16	1014 Jan 19 02:16:49	1486 -12195	Nx t-	1.0254	1.0261	-0.0726	287.5	-	-
20	-15	1032 Jan 30 10:06:26	1392 -11972	Nx t-	1.0092	1.0552	-0.0421	290.9	-	-
21	-14	1050 Feb 09 17:47:23	1303 -11749	P t-	0.9861	1.0966	0.0013	295.3	8.9	-
22	-13	1068 Feb 21 01:20:57	1218 -11526	P t-	0.9572	1.1484	0.0555	300.5	57.8	-
23	-12	1086 Mar 03 08:43:45	1138 -11303	P t-	0.9199	1.2155	0.1254	306.9	86.1	-
24	-11	1104 Mar 13 15:58:54	1062 -11080	P t-	0.8762	1.2941	0.2070	313.8	109.3	-
25	-10	1122 Mar 24 23:03:27	991 -10857	P t-	0.8240	1.3883	0.3044	321.4	130.7	-
26	-09	1140 Apr 04 05:59:42	924 -10634	P t-	0.7647	1.4955	0.4147	329.2	150.0	-
27	-08	1158 Apr 15 12:47:06	860 -10411	P t-	0.6979	1.6165	0.5388	337.1	167.7	-
28	-07	1176 Apr 25 19:28:08	801 -10188	P t-	0.6255	1.7479	0.6732	344.6	183.3	-
29	-06	1194 May 07 02:03:17	746 -9965	P t-	0.5479	1.8889	0.8169	351.5	196.8	-
30	-05	1212 May 17 08:32:49	694 -9742	P t-	0.4652	2.0394	0.9699	357.6	208.5	-

31	-04	1230	May 28	15:00:09	645	-9519	T	t-	0.3801	2.1945	1.1271	362.6	217.9	56.8
32	-03	1248	Jun 07	21:24:58	600	-9296	T	tp	0.2922	2.3548	1.2892	366.5	225.2	81.0
33	-02	1266	Jun 19	03:50:18	558	-9073	T+	pp	0.2044	2.5153	1.4511	369.2	230.3	94.8
34	-01	1284	Jun 29	10:16:00	518	-8850	T+	pp	0.1164	2.6763	1.6131	370.7	233.4	102.7
35	00	1302	Jul 10	16:46:06	481	-8627	T+	pp	0.0313	2.8320	1.7694	371.0	234.5	105.9
36	01	1320	Jul 20	23:20:21	447	-8404	T-	pp	-0.0510	2.7958	1.7335	370.2	233.9	105.3
37	02	1338	Aug 01	06:00:25	414	-8181	T-	pp	-0.1292	2.6524	1.5901	368.4	231.8	101.4
38	03	1356	Aug 11	12:47:57	384	-7958	T-	pp	-0.2017	2.5196	1.4568	365.9	228.4	94.4
39	04	1374	Aug 22	19:44:13	355	-7735	T-	pp	-0.2675	2.3991	1.3358	362.9	224.2	84.8
40	05	1392	Sep 02	02:49:46	328	-7512	T	-p	-0.3265	2.2910	1.2271	359.5	219.4	72.3
41	06	1410	Sep 13	10:04:27	303	-7289	T	-p	-0.3788	2.1956	1.1308	355.9	214.2	56.6
42	07	1428	Sep 23	17:29:54	279	-7066	T	-t	-0.4230	2.1148	1.0492	352.5	209.1	35.6
43	08	1446	Oct 05	01:05:29	256	-6843	P	-t	-0.4596	2.0480	0.9818	349.2	204.4	-
44	09	1464	Oct 15	08:50:47	234	-6620	P	-t	-0.4889	1.9945	0.9280	346.2	200.2	-
45	10	1482	Oct 26	16:45:28	214	-6397	P	-t	-0.5111	1.9538	0.8871	343.6	196.7	-
46	11	1500	Nov 06	00:48:33	195	-6174	P	-t	-0.5272	1.9239	0.8577	341.4	193.9	-
47	12	1518	Nov 17	08:59:11	177	-5951	P	-t	-0.5379	1.9040	0.8385	339.5	191.9	-
48	13	1536	Nov 27	17:14:01	161	-5728	P	-t	-0.5457	1.8889	0.8249	337.8	190.3	-
49	14	1554	Dec 09	01:34:26	146	-5505	P	-t	-0.5496	1.8808	0.8188	336.3	189.3	-
50	15	1572	Dec 19	09:56:07	133	-5282	P	-h	-0.5525	1.8740	0.8148	334.8	188.5	-
51	16	1591	Jan 09	18:19:22	123	-5059	P	-h	-0.5552	1.8674	0.8116	333.3	187.7	-
52	17	1609	Jan 20	02:39:41	108	-4836	P	-h	-0.5607	1.8552	0.8034	331.4	186.5	-
53	18	1627	Jan 31	10:59:17	84	-4613	P	-h	-0.5675	1.8404	0.7932	329.4	185.2	-
54	19	1645	Feb 10	19:13:47	56	-4390	P	-h	-0.5789	1.8168	0.7748	326.8	183.1	-
55	20	1663	Feb 22	03:23:34	31	-4167	P	-h	-0.5950	1.7845	0.7481	323.8	180.2	-
56	21	1681	Mar 04	11:26:33	13	-3944	P	-h	-0.6173	1.7406	0.7101	320.1	176.2	-
57	22	1699	Mar 15	19:23:52	8	-3721	P	-h	-0.6453	1.6862	0.6619	315.7	171.0	-
58	23	1717	Mar 27	03:13:41	10	-3498	P	-h	-0.6800	1.6192	0.6013	310.4	164.1	-

59	24	1735	Apr 07	10:56:51	11	-3275	P	-h	-0.7210	1.5408	0.5292	304.2	155.3	-
60	25	1753	Apr 17	18:33:18	13	-3052	P	-h	-0.7683	1.4508	0.4454	297.0	143.9	-
61	26	1771	Apr 29	02:04:10	16	-2829	P	-h	-0.8211	1.3509	0.3515	288.5	129.3	-
62	27	1789	May 09	09:28:39	16	-2606	P	-h	-0.8799	1.2401	0.2465	278.7	109.6	-
63	28	1807	May 21	16:49:32	12	-2383	P	-h	-0.9423	1.1229	0.1346	267.4	82.0	-
64	29	1825	Jun 01	00:06:18	10	-2160	P	-h	-1.0089	0.9983	0.0149	254.4	27.6	-
65	30	1843	Jun 12	07:22:16	6	-1937	N	-h	-1.0767	0.8717	-0.1073	240.0	-	-
66	31	1861	Jun 22	14:35:14	8	-1714	N	-a	-1.1476	0.7397	-0.2355	223.2	-	-
67	32	1879	Jul 03	21:50:28	-5	-1491	N	-a	-1.2172	0.6103	-0.3618	204.6	-	-
68	33	1897	Jul 14	05:05:19	-5	-1268	N	-a	-1.2879	0.4792	-0.4902	183.0	-	-
69	34	1915	Jul 26	12:24:39	18	-1045	N	-a	-1.3553	0.3545	-0.6129	158.7	-	-
70	35	1933	Aug 05	19:46:05	24	-822	N	-a	-1.4216	0.2322	-0.7338	129.5	-	-
71	36	1951	Aug 17	03:14:39	30	-599	N	-a	-1.4828	0.1195	-0.8456	93.6	-	-
72	37	1969	Aug 27	10:48:15	40	-376	Ne	-a	-1.5407	0.0131	-0.9516	31.3	-	-

SAROS SERIES

109

Saros series 109 contains 71 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-34	0736 Jun 27 22:44:48	3471 -15628	N	t-	-1.4922	0.1422	-0.9019	112.6	-	-	-	-	
02	-33	0754 Jul 09 05:26:24	3316 -15405	N	t-	-1.4101	0.2919	-0.7505	158.6	-	-	-	-	
03	-32	0772 Jul 19 12:13:23	3164 -15182	N	t-	-1.3311	0.4363	-0.6048	190.7	-	-	-	-	
04	-31	0790 Jul 30 19:07:33	3015 -14959	N	t-	-1.2566	0.5725	-0.4677	215.0	-	-	-	-	
05	-30	0808 Aug 10 02:09:44	2869 -14736	N	t-	-1.1873	0.6994	-0.3402	233.9	-	-	-	-	
06	-29	0826 Aug 21 09:21:41	2727 -14513	N	t-	-1.1250	0.8134	-0.2259	248.6	-	-	-	-	
07	-28	0844 Aug 31 16:41:53	2588 -14290	N	h-	-1.0684	0.9173	-0.1220	260.4	-	-	-	-	
08	-27	0862 Sep 12 00:13:30	2453 -14067	Nx	h-	-1.0201	1.0059	-0.0333	269.3	-	-	-	-	
09	-26	0880 Sep 22 07:54:42	2322 -13844	P	a-	-0.9785	1.0823	0.0430	276.2	48.6	-	-	-	
10	-25	0898 Oct 03 15:47:13	2195 -13621	P	a-	-0.9452	1.1433	0.1041	281.2	74.7	-	-	-	
11	-24	0916 Oct 13 23:48:01	2072 -13398	P	a-	-0.9178	1.1935	0.1546	284.8	90.1	-	-	-	
12	-23	0934 Oct 25 07:58:55	1953 -13175	P	a-	-0.8978	1.2298	0.1915	287.0	99.4	-	-	-	
13	-22	0952 Nov 04 16:16:46	1839 -12952	P	a-	-0.8826	1.2573	0.2199	288.4	105.8	-	-	-	
14	-21	0970 Nov 16 00:41:26	1730 -12729	P	a-	-0.8722	1.2758	0.2397	289.0	109.8	-	-	-	
15	-20	0988 Nov 26 09:10:40	1625 -12506	P	a-	-0.8647	1.2885	0.2543	289.0	112.5	-	-	-	
16	-19	1006 Dec 07 17:43:42	1524 -12283	P	a-	-0.8595	1.2968	0.2651	288.6	114.4	-	-	-	
17	-18	1024 Dec 18 02:18:03	1429 -12060	P	a-	-0.8549	1.3037	0.2750	288.1	116.0	-	-	-	
18	-17	1042 Dec 29 10:51:45	1338 -11837	P	a-	-0.8490	1.3126	0.2877	287.7	118.1	-	-	-	
19	-16	1061 Jan 08 19:24:07	1251 -11614	P	a-	-0.8414	1.3246	0.3038	287.5	120.7	-	-	-	
20	-15	1079 Jan 20 03:53:25	1169 -11391	P	a-	-0.8304	1.3424	0.3263	287.7	124.4	-	-	-	
21	-14	1097 Jan 30 12:17:27	1092 -11168	P	a-	-0.8144	1.3691	0.3581	288.5	129.3	-	-	-	
22	-13	1115 Feb 10 20:36:02	1018 -10945	P	a-	-0.7934	1.4049	0.3994	289.9	135.4	-	-	-	
23	-12	1133 Feb 21 04:48:14	950 -10722	P	a-	-0.7663	1.4517	0.4520	291.8	142.5	-	-	-	

24	-11	1151	Mar 04	12:54:24	885	-10499	P	a-	-0.7334	1.5091	0.5151	294.3	150.2	-
25	-10	1169	Mar 14	20:52:04	824	-10276	P	a-	-0.6927	1.5808	0.5927	297.4	158.8	-
26	-09	1187	Mar 26	04:44:00	767	-10053	P	a-	-0.6465	1.6627	0.6803	300.7	167.3	-
27	-08	1205	Apr 05	12:28:31	714	-9830	P	a-	-0.5935	1.7572	0.7804	304.2	175.8	-
28	-07	1223	Apr 16	20:07:47	664	-9607	P	a-	-0.5354	1.8613	0.8897	307.7	183.8	-
29	-06	1241	Apr 27	03:40:38	618	-9384	T	a-	-0.4710	1.9770	1.0102	311.1	191.2	15.3
30	-05	1259	May 08	11:10:18	574	-9161	T	a-	-0.4034	2.0988	1.1365	314.1	197.6	53.8
31	-04	1277	May 18	18:36:13	534	-8938	T	a-	-0.3321	2.2277	1.2691	316.6	203.1	72.3
32	-03	1295	May 30	01:59:34	496	-8715	T-	p-	-0.2580	2.3620	1.4067	318.6	207.4	84.6
33	-02	1313	Jun 09	09:22:06	460	-8492	T-	p-	-0.1828	2.4987	1.5459	319.9	210.5	92.7
34	-01	1331	Jun 20	16:44:34	427	-8269	T-	pp	-0.1072	2.6363	1.6856	320.6	212.4	97.6
35	00	1349	Jul 01	00:09:20	396	-8046	T-	pp	-0.0330	2.7719	1.8225	320.6	213.1	99.8
36	01	1367	Jul 12	07:35:23	366	-7823	T+	pp	0.0404	2.7579	1.8092	319.9	212.7	99.5
37	02	1385	Jul 22	15:06:49	339	-7600	T+	pp	0.1096	2.6310	1.6824	318.7	211.3	97.1
38	03	1403	Aug 02	22:42:18	313	-7377	T+	-p	0.1755	2.5103	1.5612	317.1	209.1	92.7
39	04	1421	Aug 13	06:24:23	288	-7154	T+	-p	0.2363	2.3993	1.4492	315.1	206.2	86.6
40	05	1439	Aug 24	14:12:06	265	-6931	T	-p	0.2925	2.2968	1.3451	312.9	202.9	78.7
41	06	1457	Sep 03	22:08:21	243	-6708	T	-p	0.3420	2.2069	1.2534	310.6	199.3	69.5
42	07	1475	Sep 15	06:11:44	222	-6485	T	-p	0.3855	2.1282	1.1726	308.5	195.7	58.8
43	08	1493	Sep 25	14:23:01	202	-6262	T	-p	0.4226	2.0613	1.1033	306.4	192.2	46.4
44	09	1511	Oct 06	22:42:06	184	-6039	T	-a	0.4533	2.0061	1.0457	304.7	189.0	31.4
45	10	1529	Oct 17	07:09:32	167	-5816	T	-a	0.4775	1.9630	1.0001	303.3	186.3	1.7
46	11	1547	Oct 28	15:43:40	152	-5593	P	-a	0.4960	1.9303	0.9651	302.2	184.2	-
47	12	1565	Nov 08	00:23:49	138	-5370	P	-a	0.5096	1.9065	0.9391	301.4	182.5	-
48	13	1583	Nov 29	09:08:53	127	-5147	P	-a	0.5191	1.8900	0.9208	301.0	181.3	-
49	14	1601	Dec 09	17:58:33	116	-4924	P	-a	0.5249	1.8800	0.9092	300.8	180.6	-
50	15	1619	Dec 21	02:49:28	94	-4701	P	-a	0.5298	1.8716	0.8997	300.7	180.0	-
51	16	1637	Dec 31	11:42:25	67	-4478	P	-a	0.5331	1.8660	0.8934	300.7	179.7	-

52	17	1656	Jan 11	20:33:34	40	-4255	P	-a	0.5380	1.8571	0.8843	300.5	179.2	-
53	18	1674	Jan 22	05:23:56	19	-4032	P	-a	0.5433	1.8472	0.8745	300.4	178.6	-
54	19	1692	Feb 02	14:08:39	8	-3809	P	-a	0.5536	1.8281	0.8560	299.8	177.5	-
55	20	1710	Feb 13	22:50:15	9	-3586	P	-a	0.5663	1.8043	0.8330	299.1	176.0	-
56	21	1728	Feb 25	07:24:24	10	-3363	P	-a	0.5855	1.7687	0.7984	297.8	173.5	-
57	22	1746	Mar 07	15:52:17	12	-3140	P	-a	0.6096	1.7239	0.7548	296.0	170.2	-
58	23	1764	Mar 18	00:11:05	15	-2917	P	-a	0.6410	1.6655	0.6976	293.5	165.5	-
59	24	1782	Mar 29	08:23:07	17	-2694	P	-a	0.6778	1.5974	0.6307	290.3	159.4	-
60	25	1800	Apr 09	16:26:01	13	-2471	P	-a	0.7221	1.5157	0.5500	286.0	151.0	-
61	26	1818	Apr 21	00:20:29	12	-2248	P	-a	0.7728	1.4222	0.4572	280.7	140.0	-
62	27	1836	May 01	08:06:48	5	-2025	P	-a	0.8299	1.3173	0.3528	274.0	125.2	-
63	28	1854	May 12	15:46:09	7	-1802	P	-a	0.8919	1.2035	0.2389	266.0	105.0	-
64	29	1872	May 22	23:18:24	-1	-1579	P	-a	0.9592	1.0801	0.1151	256.1	74.3	-
65	30	1890	Jun 03	06:44:42	-6	-1356	N	-a	1.0309	0.9492	-0.0168	244.1	-	-
66	31	1908	Jun 14	14:06:32	8	-1133	N	-a	1.1053	0.8135	-0.1541	229.9	-	-
67	32	1926	Jun 25	21:25:07	24	-910	N	-a	1.1814	0.6749	-0.2948	213.1	-	-
68	33	1944	Jul 06	04:40:01	27	-687	N	-a	1.2596	0.5328	-0.4398	192.7	-	-
69	34	1962	Jul 17	11:54:49	34	-464	N	-a	1.3370	0.3924	-0.5835	168.3	-	-
70	35	1980	Jul 27	19:08:59	51	-241	N	-a	1.4138	0.2535	-0.7264	137.5	-	-
71	36	1998	Aug 08	02:25:57	63	-18	N	-a	1.4875	0.1206	-0.8637	96.4	-	-

SAROS SERIES

110

Saros series 110 contains 72 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-37	0747 May 28 21:51:50	3377 -15493	Nb	a-	1.5242	0.0320	-0.9101	47.7	-	-	-	-	-
02	-36	0765 Jun 08 05:18:46	3224 -15270	N	a-	1.4527	0.1626	-0.7784	106.1	-	-	-	-	-
03	-35	0783 Jun 19 12:44:53	3074 -15047	N	a-	1.3803	0.2953	-0.6453	141.1	-	-	-	-	-
04	-34	0801 Jun 29 20:12:23	2926 -14824	N	a-	1.3087	0.4267	-0.5141	167.5	-	-	-	-	-
05	-33	0819 Jul 11 03:42:30	2782 -14601	N	a-	1.2391	0.5550	-0.3868	188.6	-	-	-	-	-
06	-32	0837 Jul 21 11:16:30	2642 -14378	N	a-	1.1723	0.6782	-0.2651	206.0	-	-	-	-	-
07	-31	0855 Aug 01 18:55:01	2506 -14155	N	a-	1.1094	0.7948	-0.1506	220.5	-	-	-	-	-
08	-30	0873 Aug 12 02:38:51	2373 -13932	N	a-	1.0508	0.9036	-0.0444	232.7	-	-	-	-	-
09	-29	0891 Aug 23 10:29:38	2244 -13709	P	a-	0.9978	1.0023	0.0513	242.8	49.0	-	-	-	-
10	-28	0909 Sep 02 18:27:38	2120 -13486	P	a-	0.9507	1.0904	0.1360	251.2	78.9	-	-	-	-
11	-27	0927 Sep 14 02:32:30	1999 -13263	P	a-	0.9095	1.1678	0.2098	258.1	97.1	-	-	-	-
12	-26	0945 Sep 24 10:45:43	1884 -13040	P	a-	0.8754	1.2324	0.2706	263.7	109.4	-	-	-	-
13	-25	0963 Oct 05 19:06:28	1772 -12817	P	a-	0.8480	1.2846	0.3190	268.1	118.0	-	-	-	-
14	-24	0981 Oct 16 03:34:43	1666 -12594	P	a-	0.8268	1.3253	0.3560	271.6	124.1	-	-	-	-
15	-23	0999 Oct 27 12:08:14	1563 -12371	P	a-	0.8103	1.3574	0.3844	274.4	128.6	-	-	-	-
16	-22	1017 Nov 06 20:48:25	1466 -12148	P	a-	0.7998	1.3784	0.4021	276.4	131.3	-	-	-	-
17	-21	1035 Nov 18 05:32:39	1373 -11925	P	a-	0.7934	1.3918	0.4124	277.9	133.0	-	-	-	-

18	-20	1053	Nov 28	14:20:20	1285	-11702	P	a-	0.7901	1.3991	0.4172	279.0	133.9	-
19	-19	1071	Dec 09	23:09:02	1201	-11479	P	a-	0.7883	1.4035	0.4194	279.9	134.4	-
20	-18	1089	Dec 20	07:58:18	1122	-11256	P	a-	0.7874	1.4060	0.4203	280.7	134.7	-
21	-17	1107	Dec 31	16:45:56	1047	-11033	P	a-	0.7857	1.4097	0.4227	281.6	135.3	-
22	-16	1126	Jan 11	01:29:55	976	-10810	P	a-	0.7818	1.4172	0.4296	282.7	136.5	-
23	-15	1144	Jan 22	10:09:46	910	-10587	P	a-	0.7750	1.4299	0.4418	284.2	138.5	-
24	-14	1162	Feb 01	18:43:30	848	-10364	P	a-	0.7638	1.4504	0.4622	286.2	141.6	-
25	-13	1180	Feb 13	03:10:08	789	-10141	P	a-	0.7474	1.4805	0.4925	288.8	145.8	-
26	-12	1198	Feb 23	11:28:24	734	-9918	P	a-	0.7245	1.5223	0.5345	292.1	151.3	-
27	-11	1216	Mar 05	19:38:20	683	-9695	P	a-	0.6956	1.5752	0.5878	296.0	157.7	-
28	-10	1234	Mar 17	03:39:29	636	-9472	P	a-	0.6601	1.6402	0.6531	300.5	165.0	-
29	-09	1252	Mar 27	11:30:34	591	-9249	P	a-	0.6170	1.7193	0.7323	305.5	172.9	-
30	-08	1270	Apr 07	19:13:13	549	-9026	P	a-	0.5674	1.8103	0.8231	310.8	181.1	-
31	-07	1288	Apr 18	02:46:56	510	-8803	P	a-	0.5112	1.9137	0.9260	316.3	189.2	-
32	-06	1306	Apr 29	10:13:32	474	-8580	T	a-	0.4499	2.0267	1.0381	321.7	196.9	29.9
33	-05	1324	May 09	17:31:33	440	-8357	T	p-	0.3823	2.1514	1.1614	327.0	204.1	59.4
34	-04	1342	May 21	00:44:45	408	-8134	T	p-	0.3114	2.2824	1.2905	331.8	210.3	76.6
35	-03	1360	May 31	07:51:57	378	-7911	T+	pp	0.2362	2.4218	1.4274	336.2	215.6	88.6
36	-02	1378	Jun 11	14:55:52	349	-7688	T+	pp	0.1591	2.5646	1.5673	339.8	219.6	96.7
37	-01	1396	Jun 21	21:56:41	323	-7465	T+	pp	0.0803	2.7111	1.7102	342.7	222.3	101.4
38	00	1414	Jul 03	04:57:15	298	-7242	T+	pp	0.0020	2.8567	1.8518	344.8	223.7	103.1
39	01	1432	Jul 13	11:58:17	274	-7019	T-	pp	-0.0751	2.7250	1.7154	346.1	223.7	101.9
40	02	1450	Jul 24	19:00:10	251	-6796	T-	pp	-0.1507	2.5888	1.5742	346.6	222.4	97.8
41	03	1468	Aug 04	02:06:04	230	-6573	T-	p-	-0.2221	2.4606	1.4404	346.4	220.0	90.8
42	04	1486	Aug 15	09:15:15	210	-6350	T	p-	-0.2900	2.3389	1.3130	345.7	216.5	80.5
43	05	1504	Aug 25	16:30:40	191	-6127	T	-a	-0.3518	2.2287	1.1966	344.6	212.3	66.5
44	06	1522	Sep 05	23:50:39	173	-5904	T	-a	-0.4089	2.1270	1.0887	343.1	207.4	46.4
45	07	1540	Sep 16	07:18:56	157	-5681	P	-a	-0.4584	2.0394	0.9947	341.6	202.4	-

46	08	1558	Sep 27	14:53:07	143	-5458	P	-a	-0.5022	1.9621	0.9112	340.1	197.2	-
47	09	1576	Oct 07	22:35:11	131	-5235	P	-a	-0.5385	1.8987	0.8417	338.9	192.4	-
48	10	1594	Oct 29	06:23:44	121	-5012	P	-a	-0.5687	1.8462	0.7833	337.9	188.0	-
49	11	1612	Nov 08	14:19:56	104	-4789	P	-h	-0.5915	1.8071	0.7387	337.3	184.5	-
50	12	1630	Nov 19	22:20:56	78	-4566	P	-h	-0.6100	1.7757	0.7024	336.9	181.4	-
51	13	1648	Nov 30	06:26:42	51	-4343	P	-h	-0.6238	1.7525	0.6748	336.9	179.0	-
52	14	1666	Dec 11	14:35:36	27	-4120	P	-h	-0.6344	1.7350	0.6536	337.0	177.2	-
53	15	1684	Dec 21	22:47:25	11	-3897	P	-h	-0.6415	1.7234	0.6389	337.4	176.0	-
54	16	1703	Jan 03	06:58:07	8	-3674	P	-h	-0.6493	1.7103	0.6236	337.6	174.7	-
55	17	1721	Jan 13	15:08:19	10	-3451	P	-t	-0.6568	1.6972	0.6089	337.6	173.4	-
56	18	1739	Jan 24	23:14:14	11	-3228	P	-t	-0.6674	1.6783	0.5892	337.2	171.5	-
57	19	1757	Feb 04	07:16:54	14	-3005	P	-t	-0.6801	1.6551	0.5658	336.5	169.0	-
58	20	1775	Feb 15	15:10:58	16	-2782	P	-t	-0.6990	1.6202	0.5314	334.8	165.0	-
59	21	1793	Feb 25	22:59:34	16	-2559	P	-t	-0.7218	1.5777	0.4899	332.5	159.7	-
60	22	1811	Mar 10	06:37:39	12	-2336	P	-t	-0.7527	1.5205	0.4340	329.0	151.9	-
61	23	1829	Mar 20	14:08:14	8	-2113	P	-t	-0.7891	1.4527	0.3680	324.5	141.5	-
62	24	1847	Mar 31	21:27:03	6	-1890	P	-t	-0.8345	1.3684	0.2856	318.2	126.4	-
63	25	1865	Apr 11	04:38:10	6	-1667	P	-t	-0.8856	1.2736	0.1929	310.4	105.4	-
64	26	1883	Apr 22	11:38:29	-6	-1444	P	-t	-0.9448	1.1639	0.0853	300.5	71.3	-
65	27	1901	May 03	18:30:38	-1	-1221	Nx	-t	-1.0101	1.0431	-0.0334	288.2	-	-
66	28	1919	May 15	01:14:00	21	-998	N	-t	-1.0820	0.9103	-0.1644	273.1	-	-
67	29	1937	May 25	07:51:34	24	-775	N	-t	-1.1581	0.7697	-0.3033	254.7	-	-
68	30	1955	Jun 05	14:23:23	31	-552	N	-t	-1.2383	0.6218	-0.4498	232.3	-	-
69	31	1973	Jun 15	20:50:41	44	-329	N	-t	-1.3216	0.4685	-0.6020	204.6	-	-
70	32	1991	Jun 27	03:15:41	58	-106	N	-t	-1.4063	0.3126	-0.7572	169.5	-	-
71	33	2009	Jul 07	09:39:43	66	117	N	-t	-1.4915	0.1562	-0.9133	121.5	-	-
72	34	2027	Jul 18	16:04:09	76	340	Ne	-t	-1.5758	0.0014	-1.0680	11.8	-	-

SAROS SERIES

111

Saros series 111 contains 71 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-34	0830 Jun 10	06:33:54	2697 -14466	Nb	t-	-1.5398	0.0457	-0.9806	63.1	-	-		
02	-33	0848 Jun 20	13:19:57	2559 -14243	N	t-	-1.4660	0.1831	-0.8468	125.2	-	-		
03	-32	0866 Jul 01	20:03:56	2425 -14020	N	t-	-1.3912	0.3224	-0.7116	164.7	-	-		
04	-31	0884 Jul 12	02:49:55	2294 -13797	N	t-	-1.3183	0.4584	-0.5801	194.7	-	-		
05	-30	0902 Jul 23	09:37:09	2168 -13574	N	t-	-1.2466	0.5924	-0.4510	219.5	-	-		
06	-29	0920 Aug 02	16:29:26	2046 -13351	N	t-	-1.1794	0.7184	-0.3302	239.7	-	-		
07	-28	0938 Aug 13	23:26:21	1929 -13128	N	t-	-1.1163	0.8370	-0.2172	256.7	-	-		
08	-27	0956 Aug 24	06:28:59	1816 -12905	N	t-	-1.0582	0.9463	-0.1135	271.0	-	-		
09	-26	0974 Sep 04	13:38:51	1707 -12682	Nx	t-	-1.0065	1.0441	-0.0215	282.8	-	-		
10	-25	0992 Sep 14	20:56:23	1603 -12459	P	t-	-0.9615	1.1297	0.0584	292.6	58.4	-		

11	-24	1010	Sep 26	04:21:48	1504	-12236	P	t-	-0.9230	1.2030	0.1262	300.6	85.2	-
12	-23	1028	Oct 06	11:54:42	1409	-12013	P	t-	-0.8911	1.2642	0.1821	307.1	101.7	-
13	-22	1046	Oct 17	19:35:27	1319	-11790	P	t-	-0.8660	1.3128	0.2258	312.2	112.7	-
14	-21	1064	Oct 28	03:23:09	1233	-11567	P	t-	-0.8469	1.3502	0.2587	316.2	120.3	-
15	-20	1082	Nov 08	11:16:05	1152	-11344	P	t-	-0.8323	1.3788	0.2835	319.3	125.6	-
16	-19	1100	Nov 18	19:14:28	1076	-11121	P	t-	-0.8223	1.3988	0.3003	321.6	129.2	-
17	-18	1118	Nov 30	03:16:19	1004	-10898	P	t-	-0.8150	1.4133	0.3124	323.3	131.6	-
18	-17	1136	Dec 10	11:19:58	936	-10675	P	t-	-0.8096	1.4241	0.3216	324.6	133.5	-
19	-16	1154	Dec 21	19:22:51	872	-10452	P	t-	-0.8036	1.4356	0.3322	325.9	135.6	-
20	-15	1173	Jan 01	03:24:43	812	-10229	P	t-	-0.7967	1.4482	0.3448	327.1	138.0	-
21	-14	1191	Jan 12	11:23:18	756	-10006	P	t-	-0.7869	1.4658	0.3631	328.6	141.3	-
22	-13	1209	Jan 22	19:16:05	703	-9783	P	t-	-0.7725	1.4916	0.3903	330.5	146.0	-
23	-12	1227	Feb 03	03:02:49	654	-9560	P	t-	-0.7531	1.5261	0.4269	333.0	151.9	-
24	-11	1245	Feb 13	10:41:36	608	-9337	P	t-	-0.7272	1.5722	0.4757	336.0	159.1	-
25	-10	1263	Feb 24	18:12:42	565	-9114	P	t-	-0.6950	1.6299	0.5364	339.5	167.4	-
26	-09	1281	Mar 07	01:33:37	525	-8891	P	t-	-0.6542	1.7029	0.6128	343.6	176.7	-
27	-08	1299	Mar 18	08:46:35	488	-8668	P	t-	-0.6068	1.7881	0.7016	348.0	186.2	-
28	-07	1317	Mar 28	15:49:55	453	-8445	P	t-	-0.5516	1.8876	0.8048	352.6	195.8	-
29	-06	1335	Apr 08	22:45:02	420	-8222	P	t-	-0.4893	2.0000	0.9209	357.1	205.0	-
30	-05	1353	Apr 19	05:32:00	389	-7999	T	t-	-0.4201	2.1251	1.0498	361.4	213.5	36.4
31	-04	1371	Apr 30	12:13:03	360	-7776	T	t-	-0.3457	2.2598	1.1879	365.0	220.9	67.6
32	-03	1389	May 10	18:48:43	333	-7553	T-	pp	-0.2665	2.4036	1.3350	367.9	226.8	85.6
33	-02	1407	May 22	01:19:29	307	-7330	T-	pp	-0.1827	2.5558	1.4902	369.9	231.2	97.2
34	-01	1425	Jun 01	07:48:18	283	-7107	T-	pp	-0.0970	2.7118	1.6488	370.9	233.8	103.8
35	00	1443	Jun 12	14:15:52	260	-6884	T-	pp	-0.0098	2.8706	1.8097	370.7	234.6	106.2
36	01	1461	Jun 22	20:44:43	238	-6661	T+	pp	0.0770	2.7463	1.6874	369.4	233.5	104.6
37	02	1479	Jul 04	03:14:45	218	-6438	T+	pp	0.1634	2.5872	1.5297	366.9	230.6	98.8
38	03	1497	Jul 14	09:49:55	198	-6215	T+	pp	0.2462	2.4347	1.3783	363.5	226.1	88.8

39	04	1515 Jul 25 16:29:57	180	-5992	T	pp	0.3252	2.2893	1.2336	359.2	220.1	73.4
40	05	1533 Aug 04 23:16:00	164	-5769	T	-t	0.3999	2.1520	1.0967	354.1	212.8	49.4
41	06	1551 Aug 16 06:09:51	149	-5546	P	-t	0.4688	2.0256	0.9702	348.7	204.5	-
42	07	1569 Aug 26 13:12:21	136	-5323	P	-t	0.5313	1.9111	0.8556	342.9	195.6	-
43	08	1587 Sep 16 20:25:05	125	-5100	P	-t	0.5857	1.8114	0.7555	337.3	186.6	-
44	09	1605 Sep 27 03:46:02	112	-4877	P	-t	0.6341	1.7229	0.6666	331.8	177.4	-
45	10	1623 Oct 08 11:18:42	88	-4654	P	-t	0.6734	1.6508	0.5941	326.8	169.1	-
46	11	1641 Oct 18 19:00:25	61	-4431	P	-t	0.7062	1.5909	0.5340	322.2	161.4	-
47	12	1659 Oct 30 02:52:52	35	-4208	P	-t	0.7310	1.5454	0.4885	318.4	155.1	-
48	13	1677 Nov 09 10:52:40	16	-3985	P	-t	0.7504	1.5096	0.4529	315.1	149.7	-
49	14	1695 Nov 20 19:02:06	8	-3762	P	-t	0.7629	1.4863	0.4303	312.6	146.0	-
50	15	1713 Dec 02 03:17:09	9	-3539	P	-h	0.7716	1.4698	0.4149	310.5	143.4	-
51	16	1731 Dec 13 11:38:06	11	-3316	P	-h	0.7764	1.4601	0.4069	308.8	141.7	-
52	17	1749 Dec 23 20:02:11	13	-3093	P	-h	0.7796	1.4532	0.4023	307.3	140.6	-
53	18	1768 Jan 04 04:29:31	16	-2870	P	-h	0.7810	1.4490	0.4011	305.9	140.1	-
54	19	1786 Jan 14 12:55:56	17	-2647	P	-h	0.7838	1.4421	0.3978	304.2	139.1	-
55	20	1804 Jan 26 21:21:21	12	-2424	P	-h	0.7882	1.4319	0.3918	302.3	137.8	-
56	21	1822 Feb 06 05:43:26	11	-2201	P	-a	0.7961	1.4151	0.3797	299.9	135.6	-
57	22	1840 Feb 17 14:02:34	5	-1978	P	-a	0.8074	1.3917	0.3615	297.0	132.3	-
58	23	1858 Feb 27 22:14:20	7	-1755	P	-a	0.8252	1.3561	0.3316	293.0	126.9	-
59	24	1876 Mar 10 06:21:31	-4	-1532	P	-a	0.8474	1.3124	0.2937	288.4	119.7	-
60	25	1894 Mar 21 14:20:27	-6	-1309	P	-h	0.8770	1.2549	0.2424	282.6	109.3	-
61	26	1912 Apr 01 22:14:16	13	-1086	P	-h	0.9116	1.1884	0.1820	275.8	95.2	-
62	27	1930 Apr 13 05:58:54	24	-863	P	-h	0.9545	1.1066	0.1064	267.3	73.4	-
63	28	1948 Apr 23 13:39:18	28	-640	P	-a	1.0016	1.0171	0.0229	257.6	34.3	-
64	29	1966 May 04 21:12:06	37	-417	N	-a	1.0553	0.9157	-0.0728	246.0	-	-
65	30	1984 May 15 04:41:03	54	-194	N	-a	1.1130	0.8071	-0.1760	232.5	-	-
66	31	2002 May 26 12:04:26	64	29	N	-a	1.1758	0.6893	-0.2888	216.6	-	-

67	32	2020 Jun 05 19:26:14	72	252	N	-a	1.2406	0.5683	-0.4053	198.2	-	-
68	33	2038 Jun 17 02:45:02	83	475	N	-a	1.3082	0.4422	-0.5275	176.3	-	-
69	34	2056 Jun 27 10:03:09	106	698	N	-a	1.3769	0.3143	-0.6519	149.9	-	-
70	35	2074 Jul 08 17:21:38	145	921	N	-a	1.4456	0.1870	-0.7765	116.6	-	-
71	36	2092 Jul 19 00:41:58	185	1144	Ne	-a	1.5131	0.0620	-0.8992	67.7	-	-

SAROS SERIES

112

Saros series 112 contains 72 lunar eclipses.

PHASE												DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-35	0859 May 20 13:38:04	2477	-14108	Nb	t-	1.5700	0.0007	-1.0461	8.1	-	-	
02	-34	0877 May 30 20:15:13	2345	-13885	N	t-	1.4857	0.1535	-0.8896	116.7	-	-	
03	-33	0895 Jun 11 02:54:24	2218	-13662	N	t-	1.4018	0.3058	-0.7339	161.9	-	-	
04	-32	0913 Jun 21 09:33:25	2094	-13439	N	t-	1.3161	0.4617	-0.5752	195.4	-	-	

05	-31	0931	Jul 02	16:18:07	1975	-13216	N	t-	1.2335	0.6120	-0.4225	220.9	-	-
06	-30	0949	Jul 12	23:05:38	1860	-12993	N	t-	1.1515	0.7615	-0.2711	241.9	-	-
07	-29	0967	Jul 24	06:00:42	1749	-12770	N	t-	1.0745	0.9020	-0.1291	258.7	-	-
08	-28	0985	Aug 03	13:01:16	1644	-12547	P	t-	1.0007	1.0368	0.0068	272.5	19.5	-
09	-27	1003	Aug 14	20:11:58	1542	-12324	P	h-	0.9340	1.1589	0.1296	283.3	83.4	-
10	-26	1021	Aug 25	03:30:44	1446	-12101	P	h-	0.8727	1.2712	0.2423	292.1	111.9	-
11	-25	1039	Sep 05	10:59:14	1354	-11878	P	a-	0.8183	1.3708	0.3423	298.9	130.6	-
12	-24	1057	Sep 15	18:37:43	1267	-11655	P	a-	0.7712	1.4572	0.4287	304.1	143.8	-
13	-23	1075	Sep 27	02:26:29	1184	-11432	P	a-	0.7320	1.5291	0.5007	307.9	153.2	-
14	-22	1093	Oct 07	10:25:02	1105	-11209	P	a-	0.6997	1.5883	0.5601	310.6	160.0	-
15	-21	1111	Oct 18	18:32:06	1032	-10986	P	a-	0.6737	1.6358	0.6080	312.4	165.0	-
16	-20	1129	Oct 29	02:48:21	962	-10763	P	a-	0.6544	1.6709	0.6437	313.4	168.2	-
17	-19	1147	Nov 09	11:11:45	896	-10540	P	a-	0.6404	1.6961	0.6699	313.8	170.4	-
18	-18	1165	Nov 19	19:41:18	835	-10317	P	a-	0.6307	1.7131	0.6884	313.6	171.7	-
19	-17	1183	Dec 01	04:15:19	777	-10094	P	a-	0.6242	1.7241	0.7013	313.1	172.4	-
20	-16	1201	Dec 11	12:52:37	723	-9871	P	a-	0.6196	1.7313	0.7110	312.4	172.9	-
21	-15	1219	Dec 22	21:30:57	673	-9648	P	a-	0.6153	1.7376	0.7203	311.6	173.3	-
22	-14	1238	Jan 02	06:08:17	626	-9425	P	a-	0.6096	1.7463	0.7326	310.9	173.9	-
23	-13	1256	Jan 13	14:44:04	582	-9202	P	a-	0.6022	1.7578	0.7483	310.4	174.9	-
24	-12	1274	Jan 23	23:16:22	541	-8979	P	a-	0.5916	1.7749	0.7699	310.0	176.3	-
25	-11	1292	Feb 04	07:43:14	502	-8756	P	a-	0.5759	1.8012	0.8012	310.0	178.4	-
26	-10	1310	Feb 14	16:04:18	466	-8533	P	a-	0.5548	1.8373	0.8425	310.5	181.3	-
27	-09	1328	Feb 26	00:18:42	433	-8310	P	a-	0.5278	1.8841	0.8948	311.2	184.7	-
28	-08	1346	Mar 08	08:26:57	401	-8087	P	a-	0.4951	1.9412	0.9574	312.3	188.5	-
29	-07	1364	Mar 18	16:26:32	372	-7864	T	a-	0.4548	2.0125	1.0342	313.8	192.8	27.8
30	-06	1382	Mar 30	00:20:27	344	-7641	T	a-	0.4091	2.0937	1.1207	315.3	197.0	50.9
31	-05	1400	Apr 09	08:06:51	317	-7418	T	a-	0.3562	2.1881	1.2202	316.9	201.2	66.5
32	-04	1418	Apr 20	15:48:18	292	-7195	T	p-	0.2987	2.2912	1.3281	318.3	205.0	78.1

33	-03	1436	Apr 30	23:23:12	269	-6972	T+	p-	0.2351	2.4058	1.4470	319.6	208.4	87.2
34	-02	1454	May 12	06:55:11	247	-6749	T+	p-	0.1683	2.5265	1.5715	320.4	210.9	93.7
35	-01	1472	May 22	14:23:05	226	-6526	T+	pp	0.0973	2.6551	1.7033	320.7	212.5	98.0
36	00	1490	Jun 02	21:49:13	206	-6303	T+	pp	0.0243	2.7877	1.8386	320.5	213.1	99.8
37	01	1508	Jun 13	05:14:02	187	-6080	T-	pp	-0.0503	2.7389	1.7918	319.6	212.6	99.4
38	02	1526	Jun 24	12:39:44	170	-5857	T-	pp	-0.1248	2.6016	1.6559	318.2	211.0	96.4
39	03	1544	Jul 04	20:06:57	154	-5634	T-	-p	-0.1982	2.4665	1.5216	316.1	208.3	90.9
40	04	1562	Jul 16	03:36:19	140	-5411	T-	-p	-0.2701	2.3345	1.3896	313.4	204.6	82.5
41	05	1580	Jul 26	11:09:58	129	-5188	T	-p	-0.3387	2.2089	1.2635	310.3	200.0	70.8
42	06	1598	Aug 16	18:47:58	119	-4965	T	-a	-0.4040	2.0897	1.1432	306.8	194.6	54.2
43	07	1616	Aug 27	02:31:49	99	-4742	T	-a	-0.4643	1.9799	1.0318	303.1	188.6	26.4
44	08	1634	Sep 07	10:21:50	72	-4519	P	-a	-0.5196	1.8794	0.9293	299.3	182.2	-
45	09	1652	Sep 17	18:19:29	45	-4296	P	-a	-0.5687	1.7906	0.8381	295.6	175.7	-
46	10	1670	Sep 29	02:24:55	23	-4073	P	-a	-0.6114	1.7135	0.7583	292.2	169.3	-
47	11	1688	Oct 09	10:37:18	9	-3850	P	-a	-0.6485	1.6468	0.6888	289.1	163.2	-
48	12	1706	Oct 21	18:58:21	9	-3627	P	-a	-0.6785	1.5933	0.6323	286.4	157.8	-
49	13	1724	Nov 01	03:26:08	10	-3404	P	-a	-0.7028	1.5502	0.5863	284.3	153.1	-
50	14	1742	Nov 12	12:01:43	12	-3181	P	-a	-0.7209	1.5183	0.5517	282.7	149.4	-
51	15	1760	Nov 22	20:41:36	15	-2958	P	-a	-0.7355	1.4928	0.5236	281.5	146.2	-
52	16	1778	Dec 04	05:27:52	17	-2735	P	-a	-0.7448	1.4769	0.5054	280.9	144.1	-
53	17	1796	Dec 14	14:16:42	15	-2512	P	-a	-0.7519	1.4648	0.4915	280.5	142.5	-
54	18	1814	Dec 26	23:08:27	12	-2289	P	-a	-0.7564	1.4573	0.4825	280.3	141.5	-
55	19	1833	Jan 06	07:59:45	6	-2066	P	-a	-0.7611	1.4491	0.4733	280.2	140.5	-
56	20	1851	Jan 17	16:50:47	7	-1843	P	-a	-0.7660	1.4406	0.4642	280.0	139.5	-
57	21	1869	Jan 28	01:38:27	2	-1620	P	-a	-0.7733	1.4272	0.4507	279.5	137.9	-
58	22	1887	Feb 08	10:22:04	-6	-1397	P	-a	-0.7836	1.4081	0.4317	278.7	135.6	-
59	23	1905	Feb 19	19:00:02	4	-1174	P	-a	-0.7984	1.3809	0.4049	277.2	132.1	-
60	24	1923	Mar 03	03:32:09	23	-951	P	-a	-0.8175	1.3453	0.3701	275.2	127.1	-

61	25	1941 Mar 13 11:55:47	25	-728	P	-a	-0.8436	1.2970	0.3226	272.2	119.8	-
62	26	1959 Mar 24 20:11:57	33	-505	P	-a	-0.8757	1.2379	0.2643	268.2	109.5	-
63	27	1977 Apr 04 04:19:04	48	-282	P	-a	-0.9148	1.1657	0.1928	262.9	94.7	-
64	28	1995 Apr 15 12:19:04	61	-59	P	-a	-0.9593	1.0836	0.1114	256.3	73.0	-
65	29	2013 Apr 25 20:08:38	68	164	P	-a	-1.0121	0.9866	0.0148	247.7	27.0	-
66	30	2031 May 07 03:52:02	78	387	N	-a	-1.0694	0.8814	-0.0904	237.3	-	-
67	31	2049 May 17 11:26:39	92	610	N	-a	-1.1337	0.7638	-0.2085	224.3	-	-
68	32	2067 May 28 18:56:08	129	833	N	-a	-1.2012	0.6403	-0.3329	208.5	-	-
69	33	2085 Jun 08 02:17:36	169	1056	N	-a	-1.2745	0.5065	-0.4682	188.5	-	-
70	34	2103 Jun 20 09:36:11	211	1279	N	-a	-1.3492	0.3704	-0.6062	163.9	-	-
71	35	2121 Jun 30 16:49:52	254	1502	N	-a	-1.4272	0.2286	-0.7505	131.0	-	-
72	36	2139 Jul 12 00:01:45	300	1725	Ne	-a	-1.5055	0.0866	-0.8957	81.9	-	-

SAROS SERIES

113

Saros series 113 contains 71 lunar eclipses.

PHASE												
DURATIONS												
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	TOTAL

NUM.	NUM.	DATE	OF	s	NUM	TYPE	MAG.	MAG.	m	m	m	
GREATEST												
ECLIPSE												
01	-37	0888 Apr 29	19:18:38	2267	-13750	Nb a-	-1.5015	0.0751	-0.8702	72.8	-	-
02	-36	0906 May 11	02:52:46	2142	-13527	N a-	-1.4355	0.1951	-0.7479	115.9	-	-
03	-35	0924 May 21	10:22:51	2021	-13304	N a-	-1.3660	0.3217	-0.6195	146.9	-	-
04	-34	0942 Jun 01	17:51:08	1905	-13081	N a-	-1.2946	0.4523	-0.4880	172.0	-	-
05	-33	0960 Jun 12	01:18:14	1792	-12858	N a-	-1.2222	0.5849	-0.3550	193.0	-	-
06	-32	0978 Jun 23	08:46:20	1685	-12635	N a-	-1.1506	0.7164	-0.2237	210.8	-	-
07	-31	0996 Jul 03	16:14:11	1582	-12412	N a-	-1.0788	0.8487	-0.0924	226.4	-	-
08	-30	1014 Jul 14	23:45:44	1483	-12189	P a-	-1.0101	0.9755	0.0329	239.7	39.3	-
09	-29	1032 Jul 25	07:19:48	1390	-11966	P a-	-0.9439	1.0982	0.1534	251.2	83.6	-
10	-28	1050 Aug 05	14:59:51	1301	-11743	P a-	-0.8826	1.2120	0.2645	261.0	108.2	-
11	-27	1068 Aug 15	22:43:39	1216	-11520	P a-	-0.8248	1.3197	0.3689	269.4	125.9	-
12	-26	1086 Aug 27	06:35:39	1136	-11297	P a-	-0.7742	1.4144	0.4600	276.3	138.8	-
13	-25	1104 Sep 06	14:33:30	1060	-11074	P a-	-0.7288	1.4997	0.5414	282.3	148.9	-
14	-24	1122 Sep 17	22:39:18	989	-10851	P a-	-0.6902	1.5725	0.6101	287.1	156.5	-
15	-23	1140 Sep 28	06:51:51	922	-10628	P a-	-0.6576	1.6345	0.6678	291.2	162.4	-
16	-22	1158 Oct 09	15:12:42	859	-10405	P a-	-0.6320	1.6837	0.7127	294.5	166.8	-
17	-21	1176 Oct 19	23:40:14	800	-10182	P a-	-0.6126	1.7214	0.7462	297.1	169.9	-
18	-20	1194 Oct 31	08:13:30	744	-9959	P a-	-0.5981	1.7500	0.7709	299.3	172.2	-
19	-19	1212 Nov 10	16:52:49	692	-9736	P a-	-0.5890	1.7685	0.7856	300.9	173.7	-
20	-18	1230 Nov 22	01:36:20	644	-9513	P a-	-0.5834	1.7804	0.7943	302.3	174.7	-
21	-17	1248 Dec 02	10:22:46	599	-9290	P a-	-0.5810	1.7864	0.7974	303.4	175.3	-
22	-16	1266 Dec 13	19:09:37	557	-9067	P a-	-0.5792	1.7909	0.7995	304.4	175.8	-
23	-15	1284 Dec 24	03:56:38	517	-8844	P a-	-0.5781	1.7938	0.8005	305.3	176.2	-
24	-14	1303 Jan 04	12:41:28	480	-8621	P a-	-0.5756	1.7992	0.8044	306.4	176.9	-
25	-13	1321 Jan 14	21:22:17	446	-8398	P a-	-0.5704	1.8092	0.8135	307.6	178.0	-

26	-12	1339	Jan 26	05:58:09	414	-8175	P	a-	-0.5615	1.8259	0.8295	309.2	179.7	-
27	-11	1357	Feb 05	14:27:27	383	-7952	P	a-	-0.5479	1.8509	0.8542	311.1	182.1	-
28	-10	1375	Feb 16	22:49:15	355	-7729	P	a-	-0.5287	1.8861	0.8894	313.5	185.1	-
29	-09	1393	Feb 27	07:02:14	328	-7506	P	a-	-0.5028	1.9337	0.9370	316.3	188.9	-
30	-08	1411	Mar 10	15:06:37	302	-7283	P	a-	-0.4704	1.9931	0.9965	319.5	193.3	-
31	-07	1429	Mar 20	23:02:11	278	-7060	T	p-	-0.4312	2.0650	1.0683	323.0	198.1	39.5
32	-06	1447	Apr 01	06:47:26	255	-6837	T	p-	-0.3842	2.1513	1.1546	326.8	203.2	58.1
33	-05	1465	Apr 11	14:24:28	234	-6614	T	p-	-0.3312	2.2489	1.2517	330.6	208.2	72.0
34	-04	1483	Apr 22	21:52:19	213	-6391	T-	p-	-0.2713	2.3591	1.3612	334.4	212.9	83.2
35	-03	1501	May 03	05:13:26	194	-6168	T-	pp	-0.2064	2.4787	1.4797	337.8	217.0	91.9
36	-02	1519	May 14	12:25:26	177	-5945	T-	pp	-0.1349	2.6107	1.6101	340.8	220.4	98.3
37	-01	1537	May 24	19:33:13	160	-5722	T-	pp	-0.0608	2.7478	1.7451	343.3	222.7	102.1
38	00	1555	Jun 05	02:34:54	146	-5499	T+	pp	0.0172	2.8291	1.8238	345.0	223.7	103.1
39	01	1573	Jun 15	09:34:00	133	-5276	T+	pp	0.0964	2.6854	1.6770	345.9	223.4	101.1
40	02	1591	Jul 06	16:29:29	123	-5053	T+	pp	0.1776	2.5381	1.5260	345.9	221.6	95.7
41	03	1609	Jul 16	23:25:49	108	-4830	T+	-p	0.2570	2.3945	1.3783	345.0	218.3	86.3
42	04	1627	Jul 28	06:21:40	83	-4607	T	-h	0.3356	2.2527	1.2317	343.3	213.5	71.4
43	05	1645	Aug 07	13:19:26	55	-4384	T	-h	0.4115	2.1160	1.0899	340.8	207.1	46.7
44	06	1663	Aug 18	20:20:08	31	-4161	P	-h	0.4840	1.9858	0.9543	337.6	199.4	-
45	07	1681	Aug 29	03:25:58	13	-3938	P	-h	0.5511	1.8655	0.8282	334.0	190.6	-
46	08	1699	Sep 09	10:37:10	8	-3715	P	-h	0.6130	1.7549	0.7117	330.0	180.7	-
47	09	1717	Sep 20	17:54:25	10	-3492	P	-h	0.6690	1.6553	0.6059	325.9	170.2	-
48	10	1735	Oct 02	01:19:13	11	-3269	P	-h	0.7178	1.5689	0.5134	322.1	159.4	-
49	11	1753	Oct 12	08:51:29	13	-3046	P	-h	0.7597	1.4949	0.4333	318.5	148.7	-
50	12	1771	Oct 23	16:30:23	16	-2823	P	-h	0.7955	1.4323	0.3649	315.3	138.3	-
51	13	1789	Nov 03	00:17:06	16	-2600	P	-h	0.8242	1.3824	0.3094	312.7	128.7	-
52	14	1807	Nov 15	08:09:59	12	-2377	P	-h	0.8473	1.3426	0.2646	310.7	120.1	-
53	15	1825	Nov 25	16:09:25	9	-2154	P	-h	0.8643	1.3137	0.2311	309.4	113.0	-

54	16	1843 Dec 07 00:11:31	6	-1931	P	-t	0.8785	1.2896	0.2031	308.3	106.6	-
55	17	1861 Dec 17 08:18:43	8	-1708	P	-t	0.8880	1.2738	0.1840	307.8	101.9	-
56	18	1879 Dec 28 16:26:22	-5	-1485	P	-t	0.8969	1.2587	0.1664	307.2	97.4	-
57	19	1898 Jan 08 00:34:46	-5	-1262	P	-t	0.9046	1.2456	0.1515	306.7	93.3	-
58	20	1916 Jan 20 08:39:41	18	-1039	P	-t	0.9146	1.2277	0.1327	305.7	87.7	-
59	21	1934 Jan 30 16:42:42	24	-816	P	-t	0.9258	1.2073	0.1120	304.3	80.9	-
60	22	1952 Feb 11 00:39:48	30	-593	P	-t	0.9416	1.1781	0.0832	301.9	70.1	-
61	23	1970 Feb 21 08:30:43	40	-370	P	-t	0.9619	1.1402	0.0463	298.5	52.7	-
62	24	1988 Mar 03 16:13:41	56	-147	Nx	-t	0.9885	1.0907	-0.0017	293.8	-	-
63	25	2006 Mar 14 23:48:34	65	76	Nx	-t	1.0210	1.0300	-0.0604	287.5	-	-
64	26	2024 Mar 25 07:13:59	74	299	N	-t	1.0609	0.9557	-0.1325	279.1	-	-
65	27	2042 Apr 05 14:30:11	86	522	N	-t	1.1080	0.8680	-0.2176	268.4	-	-
66	28	2060 Apr 15 21:37:04	114	745	N	-t	1.1621	0.7674	-0.3156	255.0	-	-
67	29	2078 Apr 27 04:35:44	153	968	N	-t	1.2222	0.6558	-0.4246	238.2	-	-
68	30	2096 May 07 11:24:42	194	1191	N	-t	1.2896	0.5309	-0.5469	216.9	-	-
69	31	2114 May 19 18:07:33	237	1414	N	-t	1.3611	0.3984	-0.6770	190.1	-	-
70	32	2132 May 30 00:42:50	282	1637	N	-t	1.4380	0.2563	-0.8169	154.4	-	-
71	33	2150 Jun 10 07:14:48	329	1860	Ne	-t	1.5171	0.1101	-0.9612	102.4	-	-

SAROS SERIES

114

Saros series 114 contains 71 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-34	0971 May 13 04:03:35	1727 -12723	Nb t-	1.5318	0.0619 -0.9674	73.4	-	-					
02	-33	0989 May 23 10:53:23	1622 -12500	N t-	1.4607	0.1935 -0.8379	128.7	-	-					
03	-32	1007 Jun 03 17:38:22	1522 -12277	N t-	1.3862	0.3314 -0.7024	167.0	-	-					
04	-31	1025 Jun 14 00:19:56	1426 -12054	N t-	1.3095	0.4737 -0.5631	197.7	-	-					
05	-30	1043 Jun 25 06:59:58	1335 -11831	N t-	1.2317	0.6181 -0.4222	223.6	-	-					
06	-29	1061 Jul 05 13:39:56	1249 -11608	N t-	1.1542	0.7624 -0.2818	245.7	-	-					
07	-28	1079 Jul 16 20:20:34	1167 -11385	N t-	1.0775	0.9052 -0.1432	264.9	-	-					
08	-27	1097 Jul 27 03:04:22	1090 -11162	Nx t-	1.0037	1.0430 -0.0101	281.3	-	-					
09	-26	1115 Aug 07 09:52:28	1017 -10939	P t-	0.9337	1.1739 0.1158	295.4	81.4	-					
10	-25	1133 Aug 17 16:46:45	948 -10716	P t-	0.8689	1.2955 0.2323	307.3	113.7	-					
11	-24	1151 Aug 28 23:46:23	883 -10493	P t-	0.8086	1.4088 0.3403	317.5	135.7	-					
12	-23	1169 Sep 08 06:54:28	822 -10270	P t-	0.7554	1.5090 0.4352	325.9	151.5	-					
13	-22	1187 Sep 19 14:09:42	766 -10047	P t-	0.7084	1.5980 0.5189	332.9	163.5	-					
14	-21	1205 Sep 29 21:33:51	713 -9824	P t-	0.6688	1.6732 0.5891	338.6	172.6	-					
15	-20	1223 Oct 11 05:05:11	663 -9601	P t-	0.6353	1.7372 0.6482	343.3	179.5	-					
16	-19	1241 Oct 21 12:45:10	616 -9378	P t-	0.6089	1.7877 0.6944	347.0	184.5	-					
17	-18	1259 Nov 01 20:31:53	573 -9155	P t-	0.5883	1.8274 0.7303	349.8	188.3	-					
18	-17	1277 Nov 12 04:24:08	532 -8932	P t-	0.5727	1.8577 0.7574	352.0	191.0	-					
19	-16	1295 Nov 23 12:21:47	495 -8709	P t-	0.5616	1.8794 0.7765	353.7	192.9	-					
20	-15	1313 Dec 03 20:22:21	459 -8486	P t-	0.5534	1.8952 0.7906	354.9	194.3	-					

21	-14	1331	Dec 15	04:24:50	426	-8263	P	t-	0.5467	1.9081	0.8025	355.8	195.5	-
22	-13	1349	Dec 25	12:25:48	395	-8040	P	t-	0.5389	1.9224	0.8167	356.6	196.8	-
23	-12	1368	Jan 05	20:26:16	366	-7817	P	t-	0.5309	1.9368	0.8316	357.3	198.1	-
24	-11	1386	Jan 16	04:22:29	338	-7594	P	t-	0.5199	1.9563	0.8526	358.1	199.9	-
25	-10	1404	Jan 27	12:13:43	312	-7371	P	t-	0.5045	1.9835	0.8819	359.1	202.2	-
26	-09	1422	Feb 06	19:58:01	287	-7148	P	t-	0.4834	2.0208	0.9219	360.4	205.2	-
27	-08	1440	Feb 18	03:35:32	264	-6925	P	t-	0.4566	2.0685	0.9728	361.9	208.8	-
28	-07	1458	Feb 28	11:04:53	242	-6702	T	t-	0.4229	2.1284	1.0365	363.6	212.8	31.3
29	-06	1476	Mar 10	18:25:12	221	-6479	T	t-	0.3817	2.2019	1.1140	365.5	217.2	53.9
30	-05	1494	Mar 22	01:37:17	202	-6256	T	t-	0.3334	2.2884	1.2046	367.4	221.7	70.1
31	-04	1512	Apr 01	08:40:58	183	-6033	T	pp	0.2778	2.3883	1.3087	369.1	225.9	82.9
32	-03	1530	Apr 12	15:36:23	166	-5810	T+	pp	0.2151	2.5012	1.4260	370.5	229.6	92.9
33	-02	1548	Apr 22	22:24:51	151	-5587	T+	pp	0.1463	2.6255	1.5543	371.4	232.4	100.3
34	-01	1566	May 04	05:06:57	138	-5364	T+	pp	0.0717	2.7603	1.6932	371.6	234.1	104.7
35	00	1584	May 24	11:45:10	126	-5141	T-	pp	-0.0065	2.8780	1.8145	370.9	234.5	106.1
36	01	1602	Jun 04	18:18:12	116	-4918	T-	pp	-0.0895	2.7239	1.6640	369.2	233.2	104.0
37	02	1620	Jun 15	00:50:49	93	-4695	T-	pp	-0.1735	2.5683	1.5114	366.5	230.2	97.9
38	03	1638	Jun 26	07:21:47	66	-4472	T-	pp	-0.2595	2.4091	1.3548	362.6	225.3	86.8
39	04	1656	Jul 06	13:55:39	40	-4249	T	-t	-0.3437	2.2535	1.2014	357.6	218.6	69.0
40	05	1674	Jul 17	20:30:10	19	-4026	T	-t	-0.4280	2.0980	1.0478	351.6	209.9	35.2
41	06	1692	Jul 28	03:10:54	8	-3803	P	-t	-0.5080	1.9505	0.9016	344.7	199.6	-
42	07	1710	Aug 09	09:55:48	9	-3580	P	-t	-0.5854	1.8080	0.7601	337.1	187.4	-
43	08	1728	Aug 19	16:48:40	10	-3357	P	-t	-0.6569	1.6763	0.6291	329.0	173.8	-
44	09	1746	Aug 30	23:48:16	12	-3134	P	-t	-0.7237	1.5537	0.5069	320.5	158.7	-
45	10	1764	Sep 10	06:58:27	15	-2911	P	-t	-0.7824	1.4458	0.3992	312.2	142.8	-
46	11	1782	Sep 21	14:17:33	17	-2688	P	-t	-0.8348	1.3498	0.3031	304.1	125.9	-
47	12	1800	Oct 02	21:46:40	13	-2465	P	-t	-0.8797	1.2673	0.2205	296.5	108.3	-
48	13	1818	Oct 14	05:25:27	12	-2242	P	-t	-0.9175	1.1981	0.1512	289.7	90.3	-

49	14	1836	Oct 24	13:14:42	5	-2019	P	-t	-0.9472	1.1435	0.0966	283.9	72.5	-
50	15	1854	Nov 04	21:12:48	7	-1796	P	-h	-0.9707	1.1004	0.0537	278.9	54.3	-
51	16	1872	Nov 15	05:19:37	-2	-1573	P	-h	-0.9876	1.0691	0.0229	275.0	35.5	-
52	17	1890	Nov 26	13:33:48	-6	-1350	P	-h	-0.9994	1.0470	0.0017	271.9	9.8	-
53	18	1908	Dec 07	21:55:09	9	-1127	Nx	-h	-1.0059	1.0344	-0.0096	269.7	-	-
54	19	1926	Dec 19	06:20:07	24	-904	Nx	-a	-1.0101	1.0257	-0.0163	268.0	-	-
55	20	1944	Dec 29	14:49:35	27	-681	Nx	-a	-1.0114	1.0220	-0.0176	266.6	-	-
56	21	1963	Jan 09	23:19:42	35	-458	Nx	-a	-1.0128	1.0180	-0.0185	265.3	-	-
57	22	1981	Jan 20	07:50:48	51	-235	Nx	-a	-1.0141	1.0136	-0.0192	263.8	-	-
58	23	1999	Jan 31	16:18:35	63	-12	Nx	-a	-1.0189	1.0027	-0.0258	261.7	-	-
59	24	2017	Feb 11	00:45:03	70	211	N	-a	-1.0254	0.9884	-0.0354	259.2	-	-
60	25	2035	Feb 22	09:06:12	81	434	N	-a	-1.0367	0.9652	-0.0535	255.7	-	-
61	26	2053	Mar 04	17:22:10	99	657	N	-a	-1.0530	0.9323	-0.0808	251.1	-	-
62	27	2071	Mar 16	01:31:09	137	880	N	-a	-1.0756	0.8879	-0.1194	245.1	-	-
63	28	2089	Mar 26	09:34:14	178	1103	N	-a	-1.1038	0.8332	-0.1681	237.8	-	-
64	29	2107	Apr 07	17:30:11	220	1326	N	-a	-1.1382	0.7671	-0.2283	228.7	-	-
65	30	2125	Apr 18	01:18:48	264	1549	N	-a	-1.1791	0.6890	-0.3005	217.5	-	-
66	31	2143	Apr 29	09:01:22	310	1772	N	-a	-1.2256	0.6009	-0.3830	204.1	-	-
67	32	2161	May 09	16:38:03	352	1995	N	-a	-1.2776	0.5027	-0.4757	187.7	-	-
68	33	2179	May 21	00:09:10	393	2218	N	-a	-1.3346	0.3956	-0.5778	167.6	-	-
69	34	2197	May 31	07:36:04	435	2441	N	-a	-1.3954	0.2817	-0.6871	142.4	-	-
70	35	2215	Jun 12	14:59:57	480	2664	N	-a	-1.4594	0.1624	-0.8024	108.9	-	-
71	36	2233	Jun 22	22:22:33	526	2887	Ne	-a	-1.5248	0.0404	-0.9208	54.8	-	-

SAROS SERIES

115

Saros series 115 contains 72 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-35	1000 Apr 21 10:47:39	1561 -12365	Nb t-	-1.5354	0.0665	-0.9847	77.8	-	-				
02	-34	1018 May 02 17:36:53	1463 -12142	N t-	-1.4601	0.2021	-0.8441	133.4	-	-				
03	-33	1036 May 13 00:23:32	1371 -11919	N t-	-1.3814	0.3440	-0.6974	171.1	-	-				
04	-32	1054 May 24 07:06:50	1282 -11696	N t-	-1.2989	0.4932	-0.5438	201.2	-	-				
05	-31	1072 Jun 03 13:50:39	1199 -11473	N t-	-1.2156	0.6440	-0.3891	225.7	-	-				
06	-30	1090 Jun 14 20:34:35	1120 -11250	N t-	-1.1311	0.7974	-0.2323	246.3	-	-				
07	-29	1108 Jun 25 03:20:28	1045 -11027	N t-	-1.0469	0.9505	-0.0762	263.7	-	-				
08	-28	1126 Jul 06 10:10:16	974 -10804	P t-	-0.9647	1.0999	0.0757	278.1	64.4	-				
09	-27	1144 Jul 16 17:05:15	908 -10581	P h-	-0.8858	1.2438	0.2217	290.0	107.6	-				
10	-26	1162 Jul 28 00:06:36	846 -10358	P h-	-0.8107	1.3808	0.3602	299.7	134.0	-				
11	-25	1180 Aug 07 07:15:04	788 -10135	P h-	-0.7403	1.5093	0.4899	307.6	152.7	-				
12	-24	1198 Aug 18 14:32:52	733 -9912	P a-	-0.6764	1.6262	0.6075	313.7	166.3	-				
13	-23	1216 Aug 28 21:59:36	682 -9689	P a-	-0.6191	1.7311	0.7130	318.4	176.5	-				

14	-22	1234	Sep 09	05:35:20	634	-9466	P	a-	-0.5682	1.8243	0.8064	321.9	184.1	-
15	-21	1252	Sep 19	13:21:02	590	-9243	P	a-	-0.5247	1.9040	0.8863	324.5	189.7	-
16	-20	1270	Sep 30	21:16:50	548	-9020	P	a-	-0.4886	1.9703	0.9527	326.1	193.7	-
17	-19	1288	Oct 11	05:22:09	509	-8797	T	a-	-0.4598	2.0229	1.0056	327.1	196.5	11.6
18	-18	1306	Oct 22	13:35:34	473	-8574	T	a-	-0.4369	2.0648	1.0478	327.6	198.4	33.4
19	-17	1324	Nov 01	21:57:32	439	-8351	T	a-	-0.4205	2.0946	1.0783	327.6	199.5	42.3
20	-16	1342	Nov 13	06:26:34	407	-8128	T	a-	-0.4091	2.1150	1.0997	327.2	200.1	47.3
21	-15	1360	Nov 23	15:00:39	377	-7905	T	a-	-0.4013	2.1286	1.1148	326.6	200.4	50.4
22	-14	1378	Dec 04	23:38:54	349	-7682	T	a-	-0.3963	2.1369	1.1249	325.8	200.4	52.2
23	-13	1396	Dec 15	08:19:17	322	-7459	T	a-	-0.3923	2.1430	1.1335	324.9	200.3	53.7
24	-12	1414	Dec 26	17:01:07	297	-7236	T	a-	-0.3889	2.1477	1.1411	324.0	200.2	55.0
25	-11	1433	Jan 06	01:40:46	273	-7013	T	p-	-0.3829	2.1570	1.1538	323.1	200.3	57.1
26	-10	1451	Jan 17	10:19:23	251	-6790	T	p-	-0.3754	2.1687	1.1695	322.3	200.6	59.5
27	-09	1469	Jan 27	18:53:18	229	-6567	T	p-	-0.3632	2.1888	1.1940	321.8	201.3	63.1
28	-08	1487	Feb 08	03:22:49	209	-6344	T	p-	-0.3469	2.2163	1.2262	321.3	202.3	67.3
29	-07	1505	Feb 18	11:45:03	190	-6121	T	p-	-0.3240	2.2559	1.2708	321.2	203.7	72.4
30	-06	1523	Mar 01	20:02:00	173	-5898	T	p-	-0.2961	2.3045	1.3244	321.2	205.3	77.7
31	-05	1541	Mar 12	04:11:19	157	-5675	T-	p-	-0.2612	2.3661	1.3912	321.3	207.1	83.3
32	-04	1559	Mar 23	12:13:18	143	-5452	T-	p-	-0.2197	2.4397	1.4698	321.5	209.0	88.5
33	-03	1577	Apr 02	20:08:13	131	-5229	T-	p-	-0.1719	2.5248	1.5598	321.7	210.7	93.1
34	-02	1595	Apr 24	03:56:44	121	-5006	T-	p-	-0.1184	2.6206	1.6602	321.7	212.0	96.7
35	-01	1613	May 04	11:39:03	103	-4783	T-	pp	-0.0593	2.7271	1.7709	321.4	212.8	99.0
36	00	1631	May 15	19:15:41	77	-4560	T+	pp	0.0052	2.8245	1.8721	320.7	213.0	99.8
37	01	1649	May 26	02:48:36	50	-4337	T+	pp	0.0732	2.6981	1.7489	319.6	212.2	98.6
38	02	1667	Jun 06	10:18:29	26	-4114	T+	pp	0.1438	2.5671	1.6205	317.8	210.4	95.2
39	03	1685	Jun 16	17:45:43	11	-3891	T+	-p	0.2172	2.4314	1.4869	315.4	207.5	89.0
40	04	1703	Jun 29	01:12:47	9	-3668	T	-p	0.2910	2.2953	1.3522	312.4	203.4	79.5
41	05	1721	Jul 09	08:39:47	10	-3445	T	-p	0.3650	2.1590	1.2167	308.7	198.1	65.2

42	06	1739 Jul 20 16:09:12	11	-3222	T	-a	0.4373	2.0265	1.0842	304.5	191.7	42.3
43	07	1757 Jul 30 23:39:48	14	-2999	P	-a	0.5087	1.8957	0.9529	299.6	183.9	-
44	08	1775 Aug 11 07:15:46	16	-2776	P	-a	0.5755	1.7737	0.8298	294.4	175.2	-
45	09	1793 Aug 21 14:55:22	16	-2553	P	-a	0.6392	1.6576	0.7120	288.8	165.5	-
46	10	1811 Sep 02 22:41:52	12	-2330	P	-a	0.6972	1.5522	0.6045	283.3	155.1	-
47	11	1829 Sep 13 06:33:27	8	-2107	P	-a	0.7509	1.4550	0.5046	277.7	143.9	-
48	12	1847 Sep 24 14:33:44	7	-1884	P	-a	0.7973	1.3714	0.4181	272.5	132.7	-
49	13	1865 Oct 04 22:40:01	5	-1661	P	-a	0.8386	1.2973	0.3408	267.6	121.2	-
50	14	1883 Oct 16 06:54:15	-6	-1438	P	-a	0.8732	1.2355	0.2757	263.3	110.1	-
51	15	1901 Oct 27 15:15:18	-0	-1215	P	-a	0.9021	1.1841	0.2208	259.6	99.4	-
52	16	1919 Nov 07 23:44:28	21	-992	P	-a	0.9246	1.1445	0.1780	256.7	89.8	-
53	17	1937 Nov 18 08:19:26	24	-769	P	-a	0.9421	1.1141	0.1443	254.5	81.3	-
54	18	1955 Nov 29 17:00:00	31	-546	P	-a	0.9551	1.0917	0.1190	253.0	74.2	-
55	19	1973 Dec 10 01:45:06	44	-323	P	-a	0.9644	1.0760	0.1007	252.0	68.5	-
56	20	1991 Dec 21 10:34:00	58	-100	P	-a	0.9709	1.0651	0.0876	251.5	64.1	-
57	21	2009 Dec 31 19:23:46	67	123	P	-a	0.9765	1.0556	0.0763	251.1	60.0	-
58	22	2028 Jan 12 04:14:13	76	346	P	-a	0.9817	1.0468	0.0662	250.7	56.0	-
59	23	2046 Jan 22 13:02:37	90	569	P	-a	0.9885	1.0347	0.0532	250.0	50.4	-
60	24	2064 Feb 02 21:48:57	122	792	P	-a	0.9969	1.0197	0.0377	249.0	42.5	-
61	25	2082 Feb 13 06:29:19	161	1015	P	-a	1.0101	0.9955	0.0134	247.2	25.5	-
62	26	2100 Feb 24 15:05:11	203	1238	N	-a	1.0267	0.9649	-0.0170	244.6	-	-
63	27	2118 Mar 07 23:33:04	246	1461	N	-a	1.0496	0.9228	-0.0588	240.8	-	-
64	28	2136 Mar 18 07:53:55	292	1684	N	-a	1.0778	0.8707	-0.1103	235.6	-	-
65	29	2154 Mar 29 16:05:07	337	1907	N	-a	1.1135	0.8049	-0.1757	228.6	-	-
66	30	2172 Apr 09 00:08:52	376	2130	N	-a	1.1548	0.7289	-0.2513	219.8	-	-
67	31	2190 Apr 20 08:03:22	418	2353	N	-a	1.2034	0.6397	-0.3402	208.3	-	-
68	32	2208 May 01 15:49:06	462	2576	N	-a	1.2583	0.5389	-0.4410	193.6	-	-
69	33	2226 May 12 23:26:43	507	2799	N	-a	1.3191	0.4276	-0.5527	174.8	-	-

70	34	2244	May 23	06:56:57	555	3022	N	-a	1.3850	0.3070	-0.6741	150.3	-	-
71	35	2262	Jun 03	14:20:47	605	3245	N	-a	1.4554	0.1784	-0.8039	116.3	-	-
72	36	2280	Jun 13	21:38:07	657	3468	Ne	-a	1.5302	0.0420	-0.9420	57.3	-	-

SAROS SERIES

116

Saros series 116 contains 73 lunar eclipses.

													PHASE	
													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-38	0993 Mar 11	00:08:28	1600	-12453	Nb a-	1.5408	0.0098	-0.9489	26.5	-	-		
02	-37	1011 Mar 22	08:13:07	1501	-12230	N a-	1.5000	0.0829	-0.8721	76.6	-	-		
03	-36	1029 Apr 01	16:09:21	1407	-12007	N a-	1.4523	0.1685	-0.7830	108.2	-	-		
04	-35	1047 Apr 13	00:00:20	1317	-11784	N a-	1.4005	0.2620	-0.6862	133.6	-	-		
05	-34	1065 Apr 23	07:42:38	1231	-11561	N a-	1.3416	0.3688	-0.5768	156.7	-	-		
06	-33	1083 May 04	15:21:46	1150	-11338	N a-	1.2799	0.4808	-0.4625	176.9	-	-		

07	-32	1101	May 14	22:54:41	1074	-11115	N	a-	1.2128	0.6032	-0.3385	195.7	-	-
08	-31	1119	May 26	06:25:57	1002	-10892	N	a-	1.1443	0.7283	-0.2124	212.3	-	-
09	-30	1137	Jun 05	13:52:59	934	-10669	N	a-	1.0723	0.8603	-0.0800	227.7	-	-
10	-29	1155	Jun 16	21:20:48	870	-10446	P	a-	1.0007	0.9917	0.0511	241.2	48.9	-
11	-28	1173	Jun 27	04:47:42	810	-10223	P	a-	0.9282	1.1252	0.1837	253.4	91.1	-
12	-27	1191	Jul 08	12:16:23	754	-10000	P	a-	0.8572	1.2564	0.3133	264.2	116.9	-
13	-26	1209	Jul 18	19:47:15	702	-9777	P	a-	0.7880	1.3845	0.4391	273.6	136.0	-
14	-25	1227	Jul 30	03:22:22	653	-9554	P	a-	0.7224	1.5062	0.5580	281.8	150.7	-
15	-24	1245	Aug 09	11:02:11	607	-9331	P	a-	0.6610	1.6206	0.6691	288.8	162.3	-
16	-23	1263	Aug 20	18:47:02	564	-9108	P	a-	0.6041	1.7269	0.7717	294.9	171.6	-
17	-22	1281	Aug 31	02:38:37	524	-8885	P	a-	0.5531	1.8227	0.8632	300.0	178.9	-
18	-21	1299	Sep 11	10:36:37	487	-8662	P	a-	0.5076	1.9082	0.9444	304.4	184.7	-
19	-20	1317	Sep 21	18:41:57	452	-8439	T	a-	0.4690	1.9815	1.0130	308.0	189.3	17.1
20	-19	1335	Oct 03	02:54:06	419	-8216	T	p-	0.4364	2.0437	1.0705	311.1	192.8	39.1
21	-18	1353	Oct 13	11:14:11	389	-7993	T	p-	0.4109	2.0928	1.1148	313.6	195.4	49.3
22	-17	1371	Oct 24	19:40:31	360	-7770	T	p-	0.3911	2.1314	1.1490	315.8	197.4	55.7
23	-16	1389	Nov 04	04:12:46	332	-7547	T	p-	0.3767	2.1601	1.1733	317.6	198.9	59.6
24	-15	1407	Nov 15	12:50:10	307	-7324	T	p-	0.3670	2.1799	1.1892	319.2	199.9	62.1
25	-14	1425	Nov 25	21:31:52	282	-7101	T	p-	0.3617	2.1914	1.1971	320.5	200.7	63.3
26	-13	1443	Dec 07	06:15:30	259	-6878	T	p-	0.3582	2.1994	1.2020	321.7	201.3	64.1
27	-12	1461	Dec 17	15:00:00	238	-6655	T	p-	0.3559	2.2049	1.2048	322.9	201.9	64.6
28	-11	1479	Dec 28	23:43:31	217	-6432	T	p-	0.3535	2.2104	1.2083	324.0	202.5	65.2
29	-10	1498	Jan 08	08:25:32	198	-6209	T	p-	0.3505	2.2168	1.2130	325.1	203.2	65.9
30	-09	1516	Jan 19	17:02:13	180	-5986	T	p-	0.3438	2.2297	1.2248	326.4	204.2	67.6
31	-08	1534	Jan 30	01:34:32	163	-5763	T	p-	0.3341	2.2478	1.2421	327.8	205.4	70.0
32	-07	1552	Feb 10	09:58:45	148	-5540	T	p-	0.3183	2.2769	1.2708	329.5	207.2	73.5
33	-06	1570	Feb 20	18:16:30	135	-5317	T	p-	0.2981	2.3142	1.3078	331.4	209.2	77.5
34	-05	1588	Mar 13	02:23:35	124	-5094	T+	p-	0.2698	2.3661	1.3596	333.5	211.6	82.5

35	-04	1606 Mar 24	10:23:18	112	-4871	T+	p-	0.2363	2.4276	1.4211	335.8	214.1	87.5
36	-03	1624 Apr 03	18:12:08	88	-4648	T+	pp	0.1945	2.5044	1.4977	338.1	216.8	92.5
37	-02	1642 Apr 15	01:52:19	60	-4425	T+	pp	0.1463	2.5930	1.5860	340.4	219.3	96.9
38	-01	1660 Apr 25	09:22:01	35	-4202	T+	pp	0.0901	2.6965	1.6890	342.5	221.4	100.5
39	00	1678 May 06	16:44:20	16	-3979	T+	pp	0.0285	2.8099	1.8015	344.3	223.0	102.5
40	01	1696 May 16	23:58:19	8	-3756	T-	pp	-0.0392	2.7910	1.7813	345.5	223.6	102.7
41	02	1714 May 29	07:05:03	10	-3533	T-	pp	-0.1120	2.6582	1.6468	346.1	223.1	100.3
42	03	1732 Jun 08	14:06:11	11	-3310	T-	-p	-0.1888	2.5185	1.5049	345.9	221.2	94.6
43	04	1750 Jun 19	21:03:03	13	-3087	T-	-p	-0.2684	2.3736	1.3573	344.7	217.7	84.6
44	05	1768 Jun 30	03:56:19	16	-2864	T	-h	-0.3499	2.2256	1.2062	342.6	212.5	68.0
45	06	1786 Jul 11	10:47:19	17	-2641	T	-t	-0.4324	2.0761	1.0530	339.3	205.2	36.3
46	07	1804 Jul 22	17:38:00	12	-2418	P	-t	-0.5141	1.9284	0.9011	335.0	195.8	-
47	08	1822 Aug 03	00:30:07	11	-2195	P	-t	-0.5938	1.7845	0.7526	329.8	184.2	-
48	09	1840 Aug 13	07:23:08	5	-1972	P	-t	-0.6716	1.6443	0.6074	323.5	170.0	-
49	10	1858 Aug 24	14:20:46	7	-1749	P	-t	-0.7446	1.5130	0.4707	316.7	153.4	-
50	11	1876 Sep 03	21:22:33	-4	-1526	P	-t	-0.8130	1.3904	0.3425	309.2	133.9	-
51	12	1894 Sep 15	04:31:25	-6	-1303	P	-t	-0.8748	1.2797	0.2261	301.7	110.9	-
52	13	1912 Sep 26	11:44:50	14	-1080	P	-t	-0.9320	1.1779	0.1183	293.9	81.7	-
53	14	1930 Oct 07	19:07:10	24	-857	P	-t	-0.9811	1.0906	0.0252	286.6	38.3	-
54	15	1948 Oct 18	02:35:41	29	-634	Nx	-t	-1.0245	1.0140	-0.0572	279.7	-	-
55	16	1966 Oct 29	10:12:53	37	-411	N	-t	-1.0599	0.9517	-0.1249	273.7	-	-
56	17	1984 Nov 08	17:56:08	54	-188	N	-t	-1.0899	0.8992	-0.1825	268.4	-	-
57	18	2002 Nov 20	01:47:40	64	35	N	-t	-1.1126	0.8600	-0.2264	264.3	-	-
58	19	2020 Nov 30	09:44:01	72	258	N	-t	-1.1309	0.8285	-0.2620	261.0	-	-
59	20	2038 Dec 11	17:45:00	84	481	N	-t	-1.1448	0.8046	-0.2892	258.5	-	-
60	21	2056 Dec 22	01:48:56	107	704	N	-t	-1.1559	0.7857	-0.3109	256.4	-	-
61	22	2075 Jan 02	09:55:03	146	927	N	-t	-1.1642	0.7714	-0.3271	254.9	-	-
62	23	2093 Jan 12	18:00:03	186	1150	N	-t	-1.1733	0.7553	-0.3444	253.1	-	-

63	24	2111	Jan 25	02:03:07	229	1373	N	-t	-1.1833	0.7371	-0.3630	250.8	-	-
64	25	2129	Feb 04	10:02:24	274	1596	N	-t	-1.1959	0.7140	-0.3858	247.6	-	-
65	26	2147	Feb 15	17:57:14	320	1819	N	-t	-1.2114	0.6849	-0.4138	243.4	-	-
66	27	2165	Feb 26	01:44:02	361	2042	N	-t	-1.2329	0.6447	-0.4524	237.1	-	-
67	28	2183	Mar 09	09:24:16	401	2265	N	-t	-1.2592	0.5953	-0.4997	229.0	-	-
68	29	2201	Mar 20	16:55:04	444	2488	N	-t	-1.2929	0.5323	-0.5602	217.8	-	-
69	30	2219	Apr 01	00:18:15	489	2711	N	-t	-1.3322	0.4587	-0.6309	203.5	-	-
70	31	2237	Apr 11	07:30:45	536	2934	N	-t	-1.3795	0.3702	-0.7163	184.3	-	-
71	32	2255	Apr 22	14:36:07	585	3157	N	-t	-1.4324	0.2717	-0.8116	159.2	-	-
72	33	2273	May 02	21:31:53	636	3380	N	-t	-1.4925	0.1598	-0.9205	123.2	-	-
73	34	2291	May 14	04:20:25	690	3603	Ne	-t	-1.5580	0.0379	-1.0391	60.6	-	-

SAROS SERIES

117

Saros series 117 contains 71 lunar eclipses.

PHASE													
DURATIONS													
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m

GREATEST

ECLIPSE

01	-34	1094	Apr 03	17:48:02	1103	-11203	Nb t-	-1.5448	0.0414	-0.9944	60.1	-	-
02	-33	1112	Apr 14	01:00:10	1030	-10980	N t-	-1.4900	0.1421	-0.8941	110.7	-	-
03	-32	1130	Apr 25	08:04:26	960	-10757	N t-	-1.4296	0.2535	-0.7835	146.8	-	-
04	-31	1148	May 05	14:59:11	895	-10534	N t-	-1.3620	0.3779	-0.6601	177.8	-	-
05	-30	1166	May 16	21:48:48	833	-10311	N t-	-1.2909	0.5092	-0.5302	204.5	-	-
06	-29	1184	May 27	04:31:35	776	-10088	N t-	-1.2148	0.6497	-0.3916	228.7	-	-
07	-28	1202	Jun 07	11:11:59	722	-9865	N t-	-1.1369	0.7939	-0.2497	250.1	-	-
08	-27	1220	Jun 17	17:47:16	672	-9642	N t-	-1.0553	0.9449	-0.1015	269.5	-	-
09	-26	1238	Jun 29	00:23:45	625	-9419	P t-	-0.9751	1.0937	0.0442	286.4	50.7	-
10	-25	1256	Jul 09	06:59:02	581	-9196	P t-	-0.8945	1.2434	0.1902	301.5	103.3	-
11	-24	1274	Jul 20	13:37:14	540	-8973	P t-	-0.8167	1.3882	0.3311	314.5	133.8	-
12	-23	1292	Jul 30	20:17:43	501	-8750	P t-	-0.7409	1.5294	0.4680	325.8	156.1	-
13	-22	1310	Aug 11	03:04:21	466	-8527	P t-	-0.6706	1.6608	0.5948	335.3	172.8	-
14	-21	1328	Aug 21	09:56:15	432	-8304	P t-	-0.6050	1.7834	0.7127	343.3	185.8	-
15	-20	1346	Sep 01	16:54:27	400	-8081	P t-	-0.5451	1.8959	0.8204	350.0	195.9	-
16	-19	1364	Sep 12	00:00:44	371	-7858	P t-	-0.4920	1.9957	0.9153	355.4	203.7	-
17	-18	1382	Sep 23	07:15:12	343	-7635	P t-	-0.4458	2.0828	0.9977	359.9	209.6	-
18	-17	1400	Oct 03	14:38:36	317	-7412	T t-	-0.4071	2.1561	1.0665	363.4	214.1	41.7
19	-16	1418	Oct 14	22:09:21	292	-7189	T t-	-0.3746	2.2179	1.1241	366.2	217.5	56.0
20	-15	1436	Oct 25	05:49:24	268	-6966	T p-	-0.3498	2.2654	1.1678	368.4	219.8	64.1
21	-14	1454	Nov 05	13:35:42	246	-6743	T p-	-0.3300	2.3033	1.2025	370.0	221.6	69.6
22	-13	1472	Nov 15	21:28:20	225	-6520	T p-	-0.3154	2.3313	1.2280	371.2	222.8	73.2
23	-12	1490	Nov 27	05:25:13	205	-6297	T p-	-0.3042	2.3528	1.2476	372.1	223.7	75.7
24	-11	1508	Dec 07	13:26:13	187	-6074	T p-	-0.2962	2.3681	1.2618	372.7	224.3	77.4
25	-10	1526	Dec 18	21:27:49	169	-5851	T p-	-0.2887	2.3819	1.2754	373.1	224.9	79.0

26	-09	1544	Dec 29	05:29:10	154	-5628	T	p-	-0.2809	2.3961	1.2900	373.4	225.5	80.7
27	-08	1563	Jan 09	13:28:27	140	-5405	T-	p-	-0.2712	2.4131	1.3084	373.5	226.2	82.6
28	-07	1581	Jan 19	21:24:57	128	-5182	T-	p-	-0.2589	2.4347	1.3320	373.6	227.0	84.9
29	-06	1599	Feb 10	05:14:35	119	-4959	T-	p-	-0.2410	2.4661	1.3663	373.8	228.1	88.0
30	-05	1617	Feb 20	12:58:54	98	-4736	T-	pp	-0.2185	2.5056	1.4091	373.9	229.3	91.4
31	-04	1635	Mar 03	20:34:50	71	-4513	T-	pp	-0.1889	2.5580	1.4653	374.1	230.7	95.3
32	-03	1653	Mar 14	04:04:31	44	-4290	T-	pp	-0.1537	2.6205	1.5320	374.1	232.1	98.9
33	-02	1671	Mar 25	11:23:35	22	-4067	T-	pp	-0.1095	2.6993	1.6154	374.0	233.4	102.3
34	-01	1689	Apr 04	18:36:37	9	-3844	T-	pp	-0.0599	2.7881	1.7089	373.6	234.2	104.7
35	00	1707	Apr 17	01:39:36	9	-3621	T-	pp	-0.0018	2.8922	1.8178	372.7	234.4	105.7
36	01	1725	Apr 27	08:37:09	10	-3398	T+	pp	0.0615	2.7803	1.7107	371.3	233.7	104.8
37	02	1743	May 08	15:26:08	12	-3175	T+	pp	0.1323	2.6480	1.5829	369.0	231.8	101.1
38	03	1761	May 18	22:11:58	15	-2952	T+	pp	0.2063	2.5099	1.4493	365.9	228.5	94.1
39	04	1779	May 30	04:52:10	17	-2729	T	pp	0.2853	2.3629	1.3064	361.7	223.4	82.1
40	05	1797	Jun 09	11:30:23	14	-2506	T	-t	0.3666	2.2119	1.1592	356.4	216.5	62.2
41	06	1815	Jun 21	18:06:32	12	-2283	T	-t	0.4498	2.0575	1.0081	349.9	207.4	14.7
42	07	1833	Jul 02	00:43:22	6	-2060	P	-t	0.5329	1.9036	0.8572	342.3	196.1	-
43	08	1851	Jul 13	07:21:41	7	-1837	P	-t	0.6154	1.7508	0.7069	333.6	182.3	-
44	09	1869	Jul 23	14:02:45	1	-1614	P	-t	0.6961	1.6017	0.5599	323.8	165.8	-
45	10	1887	Aug 03	20:48:53	-6	-1391	P	-t	0.7732	1.4595	0.4194	313.3	146.3	-
46	11	1905	Aug 15	03:40:59	5	-1168	P	-t	0.8456	1.3259	0.2871	302.3	123.1	-
47	12	1923	Aug 26	10:39:52	23	-945	P	-t	0.9133	1.2013	0.1634	290.8	94.2	-
48	13	1941	Sep 05	17:47:15	25	-722	P	-t	0.9746	1.0884	0.0511	279.3	53.4	-
49	14	1959	Sep 17	01:03:37	33	-499	N	-t	1.0296	0.9874	-0.0496	268.0	-	-
50	15	1977	Sep 27	08:30:08	48	-276	N	-t	1.0768	0.9007	-0.1361	257.5	-	-
51	16	1995	Oct 08	16:05:12	61	-53	N	-t	1.1179	0.8252	-0.2115	247.6	-	-
52	17	2013	Oct 18	23:51:25	68	170	N	-h	1.1508	0.7649	-0.2718	239.1	-	-
53	18	2031	Oct 30	07:46:45	79	393	N	-h	1.1773	0.7161	-0.3204	231.8	-	-

54	19	2049 Nov 09 15:52:11	93	616	N	-h	1.1964	0.6808	-0.3553	226.1	-	-
55	20	2067 Nov 21 00:04:42	130	839	N	-h	1.2106	0.6544	-0.3811	221.5	-	-
56	21	2085 Dec 01 08:25:35	170	1062	N	-a	1.2189	0.6387	-0.3957	218.5	-	-
57	22	2103 Dec 13 16:51:37	212	1285	N	-a	1.2239	0.6287	-0.4042	216.3	-	-
58	23	2121 Dec 24 01:22:13	256	1508	N	-a	1.2261	0.6238	-0.4071	214.8	-	-
59	24	2140 Jan 04 09:55:16	302	1731	N	-a	1.2270	0.6209	-0.4075	213.6	-	-
60	25	2158 Jan 14 18:29:52	345	1954	N	-a	1.2275	0.6184	-0.4068	212.5	-	-
61	26	2176 Jan 26 03:03:39	385	2177	N	-a	1.2292	0.6133	-0.4082	210.9	-	-
62	27	2194 Feb 05 11:34:56	427	2400	N	-a	1.2338	0.6027	-0.4146	208.5	-	-
63	28	2212 Feb 17 20:03:16	471	2623	N	-a	1.2415	0.5862	-0.4264	205.2	-	-
64	29	2230 Feb 28 04:27:10	517	2846	N	-a	1.2537	0.5612	-0.4463	200.5	-	-
65	30	2248 Mar 10 12:44:45	566	3069	N	-a	1.2717	0.5255	-0.4766	193.9	-	-
66	31	2266 Mar 21 20:56:19	616	3292	N	-a	1.2951	0.4799	-0.5167	185.4	-	-
67	32	2284 Apr 01 05:01:09	668	3515	N	-a	1.3247	0.4227	-0.5682	174.2	-	-
68	33	2302 Apr 13 12:59:53	723	3738	N	-a	1.3599	0.3552	-0.6300	160.1	-	-
69	34	2320 Apr 23 20:50:31	779	3961	N	-a	1.4021	0.2749	-0.7048	141.4	-	-
70	35	2338 May 05 04:35:58	838	4184	N	-a	1.4491	0.1860	-0.7884	116.8	-	-
71	36	2356 May 15 12:14:44	899	4407	N	-a	1.5017	0.0871	-0.8824	80.3	-	-

SAROS SERIES

118

Saros series 118 contains 73 lunar eclipses.

													PHASE
													DURATIONS
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-36	1105 Mar 02	16:23:09	1058 -11068	Nb t-	1.5583	0.0341	-1.0362	56.3	-	-		
02	-35	1123 Mar 13	23:48:00	987 -10845	N t-	1.5141	0.1123	-0.9522	101.1	-	-		
03	-34	1141 Mar 24	07:06:11	920 -10622	N t-	1.4633	0.2024	-0.8561	134.1	-	-		
04	-33	1159 Apr 04	14:16:56	857 -10399	N t-	1.4057	0.3050	-0.7475	162.5	-	-		
05	-32	1177 Apr 14	21:21:09	798 -10176	N t-	1.3418	0.4194	-0.6274	187.7	-	-		
06	-31	1195 Apr 26	04:20:15	743 -9953	N t-	1.2725	0.5438	-0.4974	210.3	-	-		
07	-30	1213 May 06	11:15:13	691 -9730	N t-	1.1983	0.6773	-0.3587	230.7	-	-		
08	-29	1231 May 17	18:06:29	643 -9507	N t-	1.1199	0.8187	-0.2123	249.0	-	-		
09	-28	1249 May 28	00:56:09	598 -9284	N t-	1.0389	0.9650	-0.0615	265.1	-	-		
10	-27	1267 Jun 08	07:45:08	556 -9061	P t-	0.9560	1.1151	0.0926	279.3	71.1	-		
11	-26	1285 Jun 18	14:36:09	516 -8838	P h-	0.8735	1.2647	0.2457	291.3	112.8	-		
12	-25	1303 Jun 29	21:28:03	479 -8615	P h-	0.7904	1.4157	0.3998	301.7	140.2	-		
13	-24	1321 Jul 10	04:25:23	445 -8392	P h-	0.7105	1.5609	0.5475	310.2	159.8	-		
14	-23	1339 Jul 21	11:26:41	413 -8169	P h-	0.6327	1.7028	0.6914	317.1	174.9	-		
15	-22	1357 Jul 31	18:35:47	382 -7946	P a-	0.5603	1.8348	0.8249	322.5	186.1	-		
16	-21	1375 Aug 12	01:50:39	354 -7723	P a-	0.4917	1.9602	0.9514	326.7	194.8	-		
17	-20	1393 Aug 22	09:15:18	327 -7500	T a-	0.4300	2.0730	1.0650	329.7	201.1	39.2		
18	-19	1411 Sep 02	16:48:09	301 -7277	T a-	0.3740	2.1755	1.1679	331.9	205.8	60.8		
19	-18	1429 Sep 13	00:30:32	277 -7054	T a-	0.3250	2.2652	1.2579	333.2	209.1	72.8		
20	-17	1447 Sep 24	08:22:29	255 -6831	T p-	0.2832	2.3420	1.3348	334.0	211.3	80.5		

21	-16	1465	Oct 04	16:24:28	233	-6608	T+	p-	0.2490	2.4047	1.3976	334.3	212.7	85.5
22	-15	1483	Oct 16	00:36:00	213	-6385	T+	p-	0.2218	2.4546	1.4476	334.2	213.5	88.7
23	-14	1501	Oct 26	08:54:58	194	-6162	T+	p-	0.1999	2.4944	1.4878	333.8	213.9	90.8
24	-13	1519	Nov 06	17:22:27	176	-5939	T+	p-	0.1846	2.5223	1.5162	333.2	213.9	92.1
25	-12	1537	Nov 17	01:55:51	160	-5716	T+	p-	0.1738	2.5416	1.5365	332.5	213.8	92.9
26	-11	1555	Nov 28	10:34:50	145	-5493	T+	p-	0.1671	2.5534	1.5495	331.7	213.5	93.3
27	-10	1573	Dec 08	19:16:17	133	-5270	T+	p-	0.1620	2.5617	1.5597	330.8	213.2	93.5
28	-09	1591	Dec 30	04:00:35	122	-5047	T+	p-	0.1588	2.5665	1.5668	329.8	212.9	93.7
29	-08	1610	Jan 09	12:44:36	107	-4824	T+	p-	0.1549	2.5721	1.5752	328.8	212.6	93.9
30	-07	1628	Jan 20	21:27:26	82	-4601	T+	p-	0.1499	2.5798	1.5861	327.9	212.4	94.2
31	-06	1646	Jan 31	06:07:04	55	-4378	T+	p-	0.1417	2.5929	1.6030	327.0	212.3	94.7
32	-05	1664	Feb 11	14:43:15	30	-4155	T+	p-	0.1303	2.6117	1.6258	326.1	212.3	95.4
33	-04	1682	Feb 21	23:13:12	13	-3932	T+	p-	0.1132	2.6408	1.6594	325.3	212.5	96.4
34	-03	1700	Mar 05	07:37:27	8	-3709	T+	p-	0.0909	2.6795	1.7026	324.5	212.7	97.5
35	-02	1718	Mar 16	15:54:36	10	-3486	T+	p-	0.0622	2.7298	1.7576	323.8	212.9	98.5
36	-01	1736	Mar 27	00:05:53	11	-3263	T+	pp	0.0283	2.7897	1.8222	323.0	213.0	99.2
37	00	1754	Apr 07	08:08:01	13	-3040	T-	pp	-0.0140	2.8135	1.8507	322.0	212.8	99.4
38	01	1772	Apr 17	16:04:45	16	-2817	T-	pp	-0.0612	2.7248	1.7663	320.9	212.3	98.6
39	02	1790	Apr 28	23:53:39	16	-2594	T-	pp	-0.1156	2.6230	1.6685	319.4	211.1	96.6
40	03	1808	May 10	07:38:16	12	-2371	T-	p	-0.1736	2.5145	1.5637	317.5	209.2	92.8
41	04	1826	May 21	15:15:25	9	-2148	T-	p	-0.2384	2.3941	1.4464	315.0	206.3	86.5
42	05	1844	May 31	22:50:43	6	-1925	T	p	-0.3050	2.2706	1.3255	312.0	202.4	77.1
43	06	1862	Jun 12	06:21:03	8	-1702	T	p	-0.3763	2.1387	1.1957	308.2	197.2	62.4
44	07	1880	Jun 22	13:50:27	-5	-1479	T	-a	-0.4484	2.0057	1.0641	303.7	190.6	37.2
45	08	1898	Jul 03	21:17:20	-5	-1256	P	-a	-0.5228	1.8689	0.9280	298.4	182.3	-
46	09	1916	Jul 15	04:46:07	19	-1033	P	-a	-0.5956	1.7351	0.7944	292.4	172.5	-
47	10	1934	Jul 26	12:15:38	24	-810	P	-a	-0.6681	1.6025	0.6612	285.7	160.8	-
48	11	1952	Aug 05	19:47:55	30	-587	P	-a	-0.7383	1.4741	0.5317	278.4	147.2	-

49	12	1970 Aug 17 03:24:06	41	-364	P	-a	-0.8053	1.3521	0.4079	270.6	131.3	-
50	13	1988 Aug 27 11:05:29	56	-141	P	-a	-0.8681	1.2380	0.2915	262.5	113.0	-
51	14	2006 Sep 07 18:52:25	65	82	P	-a	-0.9262	1.1329	0.1837	254.4	91.1	-
52	15	2024 Sep 18 02:45:25	74	305	P	-a	-0.9792	1.0372	0.0848	246.3	62.8	-
53	16	2042 Sep 29 10:45:47	87	528	N	-a	-1.0261	0.9528	-0.0031	238.5	-	-
54	17	2060 Oct 09 18:53:32	115	751	N	-a	-1.0670	0.8796	-0.0799	231.3	-	-
55	18	2078 Oct 21 03:08:03	154	974	N	-a	-1.1021	0.8171	-0.1462	224.8	-	-
56	19	2096 Oct 31 11:30:23	195	1197	N	-a	-1.1307	0.7666	-0.2006	219.3	-	-
57	20	2114 Nov 12 19:59:33	238	1420	N	-a	-1.1533	0.7270	-0.2439	214.9	-	-
58	21	2132 Nov 23 04:35:10	283	1643	N	-a	-1.1707	0.6968	-0.2776	211.4	-	-
59	22	2150 Dec 04 13:14:45	330	1866	N	-a	-1.1848	0.6727	-0.3051	208.7	-	-
60	23	2168 Dec 14 21:59:24	369	2089	N	-a	-1.1945	0.6565	-0.3242	206.9	-	-
61	24	2186 Dec 26 06:46:26	410	2312	N	-a	-1.2018	0.6443	-0.3389	205.7	-	-
62	25	2205 Jan 06 15:34:56	454	2535	N	-a	-1.2079	0.6341	-0.3511	204.7	-	-
63	26	2223 Jan 18 00:22:32	499	2758	N	-a	-1.2144	0.6230	-0.3639	203.6	-	-
64	27	2241 Jan 28 09:08:46	546	2981	N	-a	-1.2220	0.6096	-0.3784	202.1	-	-
65	28	2259 Feb 08 17:51:42	596	3204	N	-a	-1.2320	0.5917	-0.3971	199.9	-	-
66	29	2277 Feb 19 02:29:15	647	3427	N	-a	-1.2459	0.5662	-0.4229	196.5	-	-
67	30	2295 Mar 02 11:01:08	701	3650	N	-a	-1.2642	0.5329	-0.4564	191.7	-	-
68	31	2313 Mar 13 19:25:46	757	3873	N	-a	-1.2880	0.4890	-0.5001	184.8	-	-
69	32	2331 Mar 25 03:42:19	815	4096	N	-a	-1.3179	0.4341	-0.5548	175.5	-	-
70	33	2349 Apr 04 11:49:55	874	4319	N	-a	-1.3547	0.3665	-0.6222	162.7	-	-
71	34	2367 Apr 15 19:48:55	936	4542	N	-a	-1.3977	0.2876	-0.7010	145.6	-	-
72	35	2385 Apr 26 03:39:11	1000	4765	N	-a	-1.4471	0.1969	-0.7917	121.8	-	-
73	36	2403 May 07 11:19:39	1066	4988	N	-a	-1.5036	0.0934	-0.8955	85.0	-	-

SAROS SERIES

119

Saros series 119 contains 82 lunar eclipses.

													PHASE
													DURATIONS
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-48	0935 Oct 14	19:25:58	1947 -13163	N	a-	-1.5283	0.0450	-0.9379	57.9	-	-	
02	-47	0953 Oct 25	03:56:18	1833 -12940	N	a-	-1.5085	0.0814	-0.9018	77.4	-	-	
03	-46	0971 Nov 05	12:34:29	1724 -12717	N	a-	-1.4945	0.1072	-0.8761	88.5	-	-	
04	-45	0989 Nov 15	21:17:18	1619 -12494	N	a-	-1.4842	0.1259	-0.8571	95.6	-	-	
05	-44	1007 Nov 27	06:04:31	1519 -12271	N	a-	-1.4772	0.1385	-0.8438	99.9	-	-	
06	-43	1025 Dec 07	14:53:57	1424 -12048	N	a-	-1.4718	0.1477	-0.8335	102.9	-	-	
07	-42	1043 Dec 18	23:45:22	1333 -11825	N	a-	-1.4678	0.1543	-0.8254	104.9	-	-	
08	-41	1061 Dec 29	08:34:39	1247 -11602	N	a-	-1.4621	0.1638	-0.8139	107.8	-	-	
09	-40	1080 Jan 09	17:22:50	1165 -11379	N	a-	-1.4555	0.1747	-0.8005	111.1	-	-	
10	-39	1098 Jan 20	02:06:11	1088 -11156	N	a-	-1.4449	0.1928	-0.7796	116.3	-	-	
11	-38	1116 Jan 31	10:45:59	1015 -10933	N	a-	-1.4315	0.2157	-0.7536	122.5	-	-	
12	-37	1134 Feb 10	19:17:59	946 -10710	N	a-	-1.4116	0.2505	-0.7155	131.4	-	-	
13	-36	1152 Feb 22	03:44:59	881 -10487	N	a-	-1.3878	0.2925	-0.6699	141.2	-	-	

14	-35	1170	Mar 04	12:03:29	821	-10264	N	a-	-1.3569	0.3475	-0.6115	152.9	-	-
15	-34	1188	Mar 14	20:15:07	764	-10041	N	a-	-1.3205	0.4125	-0.5431	165.4	-	-
16	-33	1206	Mar 26	04:18:08	711	-9818	N	a-	-1.2770	0.4907	-0.4617	178.9	-	-
17	-32	1224	Apr 05	12:15:00	662	-9595	N	a-	-1.2286	0.5780	-0.3714	192.4	-	-
18	-31	1242	Apr 16	20:04:30	615	-9372	N	a-	-1.1740	0.6770	-0.2699	206.0	-	-
19	-30	1260	Apr 27	03:47:29	572	-9149	N	a-	-1.1141	0.7858	-0.1590	219.4	-	-
20	-29	1278	May 08	11:25:14	531	-8926	N	a-	-1.0501	0.9025	-0.0408	232.3	-	-
21	-28	1296	May 18	18:58:30	494	-8703	P	a-	-0.9826	1.0258	0.0835	244.5	62.3	-
22	-27	1314	May 30	02:28:18	458	-8480	P	a-	-0.9123	1.1547	0.2128	255.9	97.7	-
23	-26	1332	Jun 09	09:55:11	425	-8257	P	a-	-0.8396	1.2881	0.3459	266.5	122.3	-
24	-25	1350	Jun 20	17:21:47	394	-8034	P	a-	-0.7670	1.4219	0.4788	276.0	141.2	-
25	-24	1368	Jul 01	00:48:23	365	-7811	P	a-	-0.6948	1.5552	0.6105	284.5	156.4	-
26	-23	1386	Jul 12	08:15:58	337	-7588	P	a-	-0.6236	1.6869	0.7399	292.1	168.9	-
27	-22	1404	Jul 22	15:46:36	311	-7365	P	a-	-0.5553	1.8137	0.8639	298.6	178.9	-
28	-21	1422	Aug 02	23:20:42	287	-7142	P	a-	-0.4902	1.9348	0.9817	304.3	187.1	-
29	-20	1440	Aug 13	07:00:03	263	-6919	T	a-	-0.4299	2.0475	1.0904	309.1	193.5	44.1
30	-19	1458	Aug 24	14:43:49	241	-6696	T	p-	-0.3737	2.1528	1.1913	313.2	198.7	62.2
31	-18	1476	Sep 03	22:34:58	221	-6473	T	p-	-0.3243	2.2458	1.2797	316.7	202.7	73.1
32	-17	1494	Sep 15	06:32:25	201	-6250	T	p-	-0.2805	2.3287	1.3576	319.6	205.8	80.5
33	-16	1512	Sep 25	14:37:20	183	-6027	T-	p-	-0.2434	2.3993	1.4232	322.1	208.1	85.6
34	-15	1530	Oct 06	22:49:14	166	-5804	T-	p-	-0.2126	2.4583	1.4771	324.3	209.9	89.0
35	-14	1548	Oct 17	07:08:29	151	-5581	T-	p-	-0.1885	2.5051	1.5189	326.1	211.2	91.4
36	-13	1566	Oct 28	15:34:06	137	-5358	T-	p-	-0.1704	2.5409	1.5498	327.8	212.2	92.9
37	-12	1584	Nov 18	00:04:27	126	-5135	T-	p-	-0.1567	2.5683	1.5727	329.3	213.1	94.0
38	-11	1602	Nov 29	08:40:26	115	-4912	T-	p-	-0.1482	2.5860	1.5861	330.7	213.7	94.6
39	-10	1620	Dec 09	17:19:13	93	-4689	T-	p-	-0.1423	2.5987	1.5951	332.0	214.3	95.1
40	-09	1638	Dec 21	02:00:39	66	-4466	T-	pp	-0.1393	2.6058	1.5989	333.3	214.8	95.4
41	-08	1656	Dec 31	10:41:02	39	-4243	T-	pp	-0.1359	2.6134	1.6037	334.5	215.4	95.7

42	-07	1675	Jan 11	19:21:44	18	-4020	T-	pp	-0.1334	2.6192	1.6073	335.7	216.0	96.0
43	-06	1693	Jan 22	03:58:35	8	-3797	T-	pp	-0.1278	2.6302	1.6167	336.9	216.7	96.6
44	-05	1711	Feb 03	12:31:30	9	-3574	T-	pp	-0.1197	2.6458	1.6310	338.1	217.5	97.3
45	-04	1729	Feb 13	20:57:43	10	-3351	T-	pp	-0.1065	2.6705	1.6548	339.4	218.4	98.2
46	-03	1747	Feb 25	05:17:43	12	-3128	T-	pp	-0.0887	2.7034	1.6871	340.7	219.4	99.3
47	-02	1765	Mar 07	13:28:56	15	-2905	T-	pp	-0.0643	2.7483	1.7318	342.0	220.5	100.5
48	-01	1783	Mar 18	21:31:30	17	-2682	T-	pp	-0.0333	2.8053	1.7886	343.3	221.5	101.5
49	00	1801	Mar 30	05:24:05	13	-2459	T+	pp	0.0052	2.8569	1.8400	344.5	222.3	102.1
50	01	1819	Apr 10	13:07:53	12	-2236	T+	pp	0.0502	2.7745	1.7574	345.4	222.7	101.8
51	02	1837	Apr 20	20:40:45	5	-2013	T+	pp	0.1033	2.6772	1.6597	346.0	222.5	100.2
52	03	1855	May 02	04:05:23	7	-1790	T+	-p	0.1625	2.5690	1.5509	346.1	221.5	96.5
53	04	1873	May 12	11:20:26	-2	-1567	T+	-p	0.2284	2.4484	1.4294	345.5	219.3	89.9
54	05	1891	May 23	18:29:11	-6	-1344	T	-a	0.2988	2.3199	1.2996	344.1	215.7	79.1
55	06	1909	Jun 04	01:28:51	10	-1121	T	-h	0.3755	2.1800	1.1580	341.6	210.2	60.4
56	07	1927	Jun 15	08:24:41	24	-898	T	-t	0.4543	2.0365	1.0123	338.1	202.8	17.7
57	08	1945	Jun 25	15:14:22	27	-675	P	-t	0.5370	1.8862	0.8593	333.3	192.7	-
58	09	1963	Jul 06	22:02:59	35	-452	P	-t	0.6197	1.7360	0.7060	327.2	179.9	-
59	10	1981	Jul 17	04:47:40	52	-229	P	-t	0.7045	1.5822	0.5486	319.6	163.2	-
60	11	1999	Jul 28	11:34:46	64	-6	P	-t	0.7862	1.4342	0.3966	310.9	142.5	-
61	12	2017	Aug 07	18:21:38	70	217	P	-t	0.8668	1.2886	0.2464	300.9	115.2	-
62	13	2035	Aug 19	01:12:15	81	440	P	-t	0.9433	1.1507	0.1037	289.8	76.5	-
63	14	2053	Aug 29	08:05:50	100	663	Nx	-t	1.0164	1.0191	-0.0330	277.8	-	-
64	15	2071	Sep 09	15:05:41	138	886	N	-t	1.0834	0.8989	-0.1586	265.2	-	-
65	16	2089	Sep 19	22:11:17	179	1109	N	-t	1.1447	0.7893	-0.2737	252.2	-	-
66	17	2107	Oct 02	05:23:19	221	1332	N	-t	1.1997	0.6911	-0.3775	239.2	-	-
67	18	2125	Oct 12	12:43:06	265	1555	N	-t	1.2476	0.6061	-0.4679	226.6	-	-
68	19	2143	Oct 23	20:10:38	312	1778	N	-t	1.2885	0.5336	-0.5457	214.8	-	-
69	20	2161	Nov 03	03:45:49	353	2001	N	-t	1.3226	0.4736	-0.6107	204.1	-	-

70	21	2179	Nov 14	11:28:05	394	2224	N	-t	1.3504	0.4249	-0.6641	194.8	-	-
71	22	2197	Nov 24	19:17:17	436	2447	N	-t	1.3722	0.3870	-0.7061	187.0	-	-
72	23	2215	Dec 07	03:12:05	481	2670	N	-t	1.3891	0.3578	-0.7388	180.7	-	-
73	24	2233	Dec 17	11:10:37	527	2893	N	-t	1.4027	0.3343	-0.7651	175.4	-	-
74	25	2251	Dec 28	19:12:49	576	3116	N	-t	1.4131	0.3163	-0.7853	171.1	-	-
75	26	2270	Jan 08	03:16:20	627	3339	N	-t	1.4224	0.2999	-0.8031	167.1	-	-
76	27	2288	Jan 19	11:19:30	680	3562	N	-t	1.4316	0.2832	-0.8203	162.8	-	-
77	28	2306	Jan 30	19:20:01	734	3785	N	-t	1.4427	0.2627	-0.8406	157.2	-	-
78	29	2324	Feb 11	03:17:27	791	4008	N	-t	1.4561	0.2377	-0.8646	149.9	-	-
79	30	2342	Feb 21	11:09:44	850	4231	N	-t	1.4735	0.2049	-0.8958	139.6	-	-
80	31	2360	Mar 03	18:54:38	912	4454	N	-t	1.4964	0.1618	-0.9366	124.5	-	-
81	32	2378	Mar 15	02:32:23	975	4677	N	-t	1.5246	0.1087	-0.9871	102.5	-	-
82	33	2396	Mar 25	10:01:24	1040	4900	Ne	-t	1.5593	0.0434	-1.0492	65.1	-	-

SAROS SERIES

120

Saros series 120 contains 83 lunar eclipses.

PHASE

DURATIONS

SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-42	1000 Oct 16	01:35:42	1558 -12359	N	a-	1.5463	0.0276	-0.9862	47.1	-	-	
02	-41	1018 Oct 27	09:53:57	1461 -12136	N	a-	1.5341	0.0527	-0.9666	65.2	-	-	
03	-40	1036 Nov 06	18:16:32	1368 -11913	N	a-	1.5260	0.0701	-0.9544	75.4	-	-	
04	-39	1054 Nov 18	02:44:30	1280 -11690	N	a-	1.5231	0.0778	-0.9513	79.7	-	-	
05	-38	1072 Nov 28	11:14:15	1196 -11467	N	a-	1.5223	0.0815	-0.9518	81.8	-	-	
06	-37	1090 Dec 09	19:45:28	1117 -11244	N	a-	1.5233	0.0813	-0.9555	82.0	-	-	
07	-36	1108 Dec 20	04:16:00	1043 -11021	N	a-	1.5246	0.0804	-0.9593	81.9	-	-	
08	-35	1126 Dec 31	12:45:19	973 -10798	N	h-	1.5261	0.0787	-0.9632	81.3	-	-	
09	-34	1145 Jan 10	21:09:35	906 -10575	N	h-	1.5241	0.0833	-0.9604	83.9	-	-	
10	-33	1163 Jan 22	05:29:14	844 -10352	N	h-	1.5192	0.0929	-0.9520	88.8	-	-	
11	-32	1181 Feb 01	13:41:16	786 -10129	N	h-	1.5091	0.1119	-0.9337	97.6	-	-	
12	-31	1199 Feb 12	21:46:45	732 -9906	N	h-	1.4944	0.1390	-0.9070	108.9	-	-	
13	-30	1217 Feb 23	05:41:09	681 -9683	N	t-	1.4720	0.1803	-0.8659	123.9	-	-	
14	-29	1235 Mar 06	13:27:40	633 -9460	N	t-	1.4439	0.2318	-0.8143	140.3	-	-	
15	-28	1253 Mar 16	21:02:30	589 -9237	N	t-	1.4071	0.2992	-0.7467	158.9	-	-	
16	-27	1271 Mar 28	04:28:45	547 -9014	N	t-	1.3642	0.3779	-0.6679	177.8	-	-	
17	-26	1289 Apr 07	11:43:12	508 -8791	N	t-	1.3125	0.4727	-0.5732	197.6	-	-	
18	-25	1307 Apr 18	18:50:03	472 -8568	N	t-	1.2553	0.5777	-0.4683	216.9	-	-	
19	-24	1325 Apr 29	01:47:03	438 -8345	N	t-	1.1908	0.6965	-0.3501	236.1	-	-	
20	-23	1343 May 10	08:36:45	406 -8122	N	t-	1.1208	0.8253	-0.2221	254.5	-	-	
21	-22	1361 May 20	15:19:11	376 -7899	N	t-	1.0453	0.9645	-0.0841	272.0	-	-	
22	-21	1379 May 31	21:57:14	348 -7676	P	t-	0.9665	1.1098	0.0597	288.2	58.8	-	
23	-20	1397 Jun 11	04:31:36	321 -7453	P	t-	0.8850	1.2603	0.2082	303.0	107.8	-	
24	-19	1415 Jun 22	11:03:06	296 -7230	P	t-	0.8015	1.4148	0.3602	316.4	139.0	-	

25	-18	1433	Jul 02	17:34:56	273	-7007	P	t-	0.7183	1.5689	0.5115	328.2	162.2	-
26	-17	1451	Jul 14	00:07:29	250	-6784	P	t-	0.6357	1.7221	0.6615	338.5	180.3	-
27	-16	1469	Jul 24	06:42:46	229	-6561	P	t-	0.5556	1.8708	0.8066	347.3	194.6	-
28	-15	1487	Aug 04	13:21:13	209	-6338	P	t-	0.4783	2.0146	0.9466	354.6	205.8	-
29	-14	1505	Aug 14	20:05:59	190	-6115	T	t-	0.4063	2.1487	1.0766	360.6	214.4	44.7
30	-13	1523	Aug 26	02:57:01	173	-5892	T	t-	0.3395	2.2735	1.1971	365.5	221.0	68.9
31	-12	1541	Sep 05	09:54:46	157	-5669	T	pp	0.2784	2.3879	1.3072	369.3	225.8	82.7
32	-11	1559	Sep 16	17:01:00	142	-5446	T+	pp	0.2244	2.4891	1.4041	372.2	229.3	91.3
33	-10	1577	Sep 27	00:16:07	130	-5223	T+	pp	0.1781	2.5760	1.4869	374.4	231.6	96.7
34	-09	1595	Oct 18	07:40:06	121	-5000	T+	pp	0.1391	2.6497	1.5567	376.0	233.1	100.2
35	-08	1613	Oct 28	15:11:40	102	-4777	T+	pp	0.1064	2.7115	1.6149	377.2	234.1	102.3
36	-07	1631	Nov 08	22:51:38	76	-4554	T+	pp	0.0805	2.7605	1.6608	378.1	234.7	103.5
37	-06	1649	Nov 19	06:38:54	49	-4331	T+	pp	0.0608	2.7980	1.6957	378.6	234.9	104.1
38	-05	1667	Nov 30	14:31:26	26	-4108	T+	pp	0.0455	2.8269	1.7228	379.0	235.1	104.5
39	-04	1685	Dec 10	22:29:22	11	-3885	T+	pp	0.0346	2.8476	1.7422	379.1	235.1	104.7
40	-03	1703	Dec 23	06:29:54	9	-3662	T+	pp	0.0258	2.8640	1.7582	379.1	235.1	104.7
41	-02	1722	Jan 02	14:32:53	10	-3439	T+	pp	0.0187	2.8768	1.7714	378.9	235.0	104.8
42	-01	1740	Jan 13	22:33:33	12	-3216	T+	pp	0.0096	2.8928	1.7887	378.5	235.0	104.9
43	00	1758	Jan 24	06:34:14	14	-2993	T+	pp	0.0003	2.9089	1.8067	378.0	234.9	104.9
44	01	1776	Feb 04	14:29:50	16	-2770	T-	pp	-0.0128	2.8846	1.7851	377.4	234.7	104.9
45	02	1794	Feb 14	22:21:16	15	-2547	T-	pp	-0.0300	2.8514	1.7553	376.5	234.5	104.8
46	03	1812	Feb 27	06:04:51	12	-2324	T-	pp	-0.0538	2.8057	1.7135	375.5	234.1	104.3
47	04	1830	Mar 09	13:42:57	7	-2101	T-	pp	-0.0824	2.7510	1.6632	374.2	233.4	103.3
48	05	1848	Mar 19	21:12:12	7	-1878	T-	pp	-0.1186	2.6823	1.5993	372.5	232.4	101.4
49	06	1866	Mar 31	04:33:35	5	-1655	T-	pp	-0.1614	2.6011	1.5232	370.4	230.7	98.2
50	07	1884	Apr 10	11:46:34	-6	-1432	T-	pp	-0.2116	2.5064	1.4337	367.7	228.2	92.9
51	08	1902	Apr 22	18:52:40	0	-1209	T-	pp	-0.2680	2.4002	1.3327	364.3	224.6	84.6
52	09	1920	May 03	01:51:08	21	-986	T	-p	-0.3312	2.2818	1.2194	360.1	219.7	71.5

53	10	1938 May 14 08:44:00	24	-763	T	-t	-0.3994	2.1540	1.0966	354.9	213.1	49.4	
54	11	1956 May 24 15:31:52	32	-540	P	-t	-0.4726	2.0174	0.9647	348.5	204.5	-	
55	12	1974 Jun 04 22:16:44	45	-317	P	-t	-0.5488	1.8752	0.8269	341.0	193.6	-	
56	13	1992 Jun 15 04:57:57	59	-94	P	-t	-0.6288	1.7264	0.6822	332.2	179.8	-	
57	14	2010 Jun 26 11:39:34	67	129	P	-t	-0.7091	1.5773	0.5368	322.1	162.9	-	
58	15	2028 Jul 06 18:20:57	77	352	P	-t	-0.7903	1.4266	0.3892	310.6	141.5	-	
59	16	2046 Jul 18 01:06:05	90	575	P	-t	-0.8691	1.2807	0.2461	298.1	114.6	-	
60	17	2064 Jul 28 07:52:48	123	798	P	-t	-0.9473	1.1361	0.1038	284.3	75.7	-	
61	18	2082 Aug 08 14:46:42	163	1021	Nx	-t	-1.0203	1.0011	-0.0294	269.8	-	-	
62	19	2100 Aug 19 21:44:58	204	1244	N	-t	-1.0905	0.8716	-0.1575	254.2	-	-	
63	20	2118 Aug 31 04:51:45	247	1467	N	-t	-1.1543	0.7540	-0.2740	238.5	-	-	
64	21	2136 Sep 10 12:05:06	293	1690	N	-t	-1.2134	0.6452	-0.3821	222.2	-	-	
65	22	2154 Sep 21 19:29:06	338	1913	N	-t	-1.2646	0.5510	-0.4759	206.5	-	-	
66	23	2172 Oct 02 03:01:41	378	2136	N	-h	-1.3098	0.4681	-0.5586	191.3	-	-	
67	24	2190 Oct 13 10:43:55	419	2359	N	-h	-1.3479	0.3979	-0.6285	176.9	-	-	
68	25	2208 Oct 24 18:36:02	463	2582	N	-h	-1.3789	0.3410	-0.6853	164.2	-	-	
69	26	2226 Nov 05 02:38:01	509	2805	N	-h	-1.4024	0.2977	-0.7283	153.5	-	-	
70	27	2244 Nov 15 10:48:54	557	3028	N	-a	-1.4201	0.2651	-0.7605	144.8	-	-	
71	28	2262 Nov 26 19:06:54	606	3251	N	-a	-1.4327	0.2415	-0.7833	138.1	-	-	
72	29	2280 Dec 07 03:32:38	659	3474	N	-a	-1.4402	0.2273	-0.7964	133.7	-	-	
73	30	2298 Dec 18 12:03:40	713	3697	N	-a	-1.4439	0.2196	-0.8025	131.1	-	-	
74	31	2316 Dec 29 20:38:45	769	3920	N	-a	-1.4452	0.2162	-0.8039	129.7	-	-	
75	32	2335 Jan 10 05:16:00	827	4143	N	-a	-1.4453	0.2147	-0.8029	128.9	-	-	
76	33	2353 Jan 20 13:54:28	887	4366	N	-a	-1.4453	0.2132	-0.8012	128.0	-	-	
77	34	2371 Jan 31 22:31:48	950	4589	N	-a	-1.4466	0.2089	-0.8019	126.3	-	-	
78	35	2389 Feb 11 07:06:06	1014	4812	N	-a	-1.4510	0.1989	-0.8078	122.9	-	-	
79	36	2407 Feb 22 15:37:08	1081	5035	N	-a	-1.4584	0.1829	-0.8192	117.6	-	-	
80	37	2425 Mar 05 00:03:15	1149	5258	N	-a	-1.4701	0.1590	-0.8383	109.5	-	-	

81	38	2443	Mar 16	08:22:54	1220	5481	N	-a	-1.4877	0.1241	-0.8680	96.7	-	-
82	39	2461	Mar 26	16:36:11	1292	5704	N	-a	-1.5110	0.0788	-0.9080	77.1	-	-
83	40	2479	Apr 07	00:42:37	1367	5927	Ne	-a	-1.5402	0.0223	-0.9591	41.1	-	-

SAROS SERIES

121

Saros series 121 contains 82 lunar eclipses.

													PHASE	
													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-35	1047	Oct 06	19:05:28	1314	-11778	N	t-	-1.5573	0.0467	-1.0450	67.2	-	-
02	-34	1065	Oct 17	02:42:50	1229	-11555	N	t-	-1.5292	0.0992	-0.9943	97.5	-	-
03	-33	1083	Oct 28	10:27:33	1148	-11332	N	t-	-1.5062	0.1421	-0.9530	116.2	-	-
04	-32	1101	Nov 07	18:20:53	1072	-11109	N	t-	-1.4895	0.1732	-0.9228	127.7	-	-
05	-31	1119	Nov 19	02:18:55	1000	-10886	N	t-	-1.4760	0.1981	-0.8981	136.2	-	-
06	-30	1137	Nov 29	10:23:17	932	-10663	N	t-	-1.4668	0.2147	-0.8810	141.3	-	-

07	-29	1155	Dec 10	18:29:45	868	-10440	N	t-	-1.4587	0.2291	-0.8655	145.5	-	-
08	-28	1173	Dec 21	02:37:51	809	-10217	N	t-	-1.4510	0.2421	-0.8504	149.1	-	-
09	-27	1192	Jan 01	10:45:09	753	-9994	N	t-	-1.4420	0.2573	-0.8325	153.1	-	-
10	-26	1210	Jan 11	18:51:00	700	-9771	N	t-	-1.4309	0.2758	-0.8105	157.8	-	-
11	-25	1228	Jan 23	02:52:19	651	-9548	N	h-	-1.4157	0.3017	-0.7805	164.1	-	-
12	-24	1246	Feb 02	10:48:40	606	-9325	N	h-	-1.3956	0.3361	-0.7413	172.1	-	-
13	-23	1264	Feb 13	18:38:57	563	-9102	N	h-	-1.3699	0.3805	-0.6915	181.7	-	-
14	-22	1282	Feb 24	02:23:04	523	-8879	N	h-	-1.3383	0.4357	-0.6307	192.7	-	-
15	-21	1300	Mar 06	09:58:08	486	-8656	N	h-	-1.2987	0.5054	-0.5550	205.4	-	-
16	-20	1318	Mar 17	17:27:00	451	-8433	N	h-	-1.2533	0.5856	-0.4687	218.5	-	-
17	-19	1336	Mar 28	00:47:28	418	-8210	N	h-	-1.2002	0.6799	-0.3682	232.3	-	-
18	-18	1354	Apr 08	08:02:44	388	-7987	N	h-	-1.1418	0.7840	-0.2580	245.7	-	-
19	-17	1372	Apr 18	15:09:54	359	-7764	N	h-	-1.0757	0.9022	-0.1338	259.3	-	-
20	-16	1390	Apr 29	22:13:51	332	-7541	Nx	h-	-1.0059	1.0275	-0.0029	271.9	-	-
21	-15	1408	May 10	05:12:17	306	-7318	P	h-	-0.9307	1.1628	0.1378	283.7	86.1	-
22	-14	1426	May 21	12:09:04	282	-7095	P	h-	-0.8528	1.3032	0.2833	294.4	120.4	-
23	-13	1444	May 31	19:03:18	259	-6872	P	h-	-0.7715	1.4502	0.4347	303.9	145.3	-
24	-12	1462	Jun 12	01:58:55	237	-6649	P	h-	-0.6901	1.5974	0.5860	312.0	164.2	-
25	-11	1480	Jun 22	08:55:27	216	-6426	P	h-	-0.6085	1.7455	0.7375	318.9	179.1	-
26	-10	1498	Jul 03	15:54:47	197	-6203	P	a-	-0.5279	1.8917	0.8867	324.4	190.8	-
27	-09	1516	Jul 13	22:58:24	179	-5980	T	a-	-0.4501	2.0335	1.0308	328.7	199.7	27.4
28	-08	1534	Jul 25	06:07:01	163	-5757	T	a-	-0.3754	2.1695	1.1688	331.9	206.4	61.1
29	-07	1552	Aug 04	13:22:37	148	-5534	T	a-	-0.3055	2.2970	1.2978	334.1	211.3	77.5
30	-06	1570	Aug 15	20:44:34	135	-5311	T-	p-	-0.2401	2.4165	1.4183	335.4	214.6	87.6
31	-05	1588	Sep 05	04:15:59	124	-5088	T-	p-	-0.1818	2.5231	1.5254	336.0	216.6	93.8
32	-04	1606	Sep 16	11:55:21	111	-4865	T-	p-	-0.1295	2.6189	1.6216	336.0	217.7	97.5
33	-03	1624	Sep 26	19:44:24	87	-4642	T-	pp	-0.0845	2.7014	1.7042	335.6	218.0	99.5
34	-02	1642	Oct 08	03:42:19	60	-4419	T-	pp	-0.0462	2.7719	1.7746	335.0	217.9	100.3

35	-01	1660	Oct 18	11:50:08	34	-4196	T-	pp	-0.0151	2.8289	1.8316	334.2	217.5	100.5
36	00	1678	Oct 29	20:06:20	15	-3973	T+	pp	0.0093	2.8395	1.8422	333.2	216.9	100.2
37	01	1696	Nov 09	04:30:21	8	-3750	T+	pp	0.0281	2.8049	1.8078	332.3	216.3	99.8
38	02	1714	Nov 21	13:01:44	10	-3527	T+	pp	0.0414	2.7803	1.7836	331.3	215.6	99.4
39	03	1732	Dec 01	21:39:42	11	-3304	T+	pp	0.0502	2.7638	1.7678	330.4	215.1	99.0
40	04	1750	Dec 13	06:21:46	13	-3081	T+	pp	0.0561	2.7524	1.7576	329.5	214.5	98.7
41	05	1768	Dec 23	15:07:13	16	-2858	T+	pp	0.0597	2.7449	1.7517	328.6	214.1	98.4
42	06	1787	Jan 03	23:53:37	17	-2635	T+	pp	0.0632	2.7375	1.7465	327.6	213.6	98.2
43	07	1805	Jan 15	08:40:58	12	-2412	T+	pp	0.0663	2.7305	1.7420	326.7	213.2	98.1
44	08	1823	Jan 26	17:24:54	11	-2189	T+	pp	0.0729	2.7169	1.7314	325.7	212.8	97.8
45	09	1841	Feb 06	02:07:13	5	-1966	T+	pp	0.0812	2.6999	1.7178	324.7	212.4	97.5
46	10	1859	Feb 17	10:43:28	7	-1743	T+	pp	0.0950	2.6727	1.6944	323.6	211.9	96.9
47	11	1877	Feb 27	19:15:38	-4	-1520	T+	-p	0.1125	2.6386	1.6644	322.5	211.3	96.2
48	12	1895	Mar 11	03:39:10	-6	-1297	T+	-p	0.1376	2.5904	1.6204	321.2	210.5	94.8
49	13	1913	Mar 22	11:57:49	15	-1074	T+	-p	0.1671	2.5340	1.5683	319.7	209.4	92.8
50	14	1931	Apr 02	20:07:55	24	-851	T+	-p	0.2043	2.4637	1.5021	317.9	207.8	89.6
51	15	1949	Apr 13	04:11:25	29	-628	T+	-p	0.2474	2.3825	1.4251	315.8	205.7	84.9
52	16	1967	Apr 24	12:07:04	38	-405	T	-p	0.2972	2.2892	1.3356	313.3	202.8	77.9
53	17	1985	May 04	19:57:19	55	-182	T	-p	0.3519	2.1870	1.2369	310.2	198.9	67.7
54	18	2003	May 16	03:41:13	64	41	T	-a	0.4123	2.0747	1.1276	306.5	193.9	51.4
55	19	2021	May 26	11:19:53	72	264	T	-a	0.4774	1.9540	1.0095	302.0	187.4	14.5
56	20	2039	Jun 06	18:54:25	84	487	P	-a	0.5460	1.8272	0.8846	296.7	179.3	-
57	21	2057	Jun 17	02:26:20	108	710	P	-a	0.6167	1.6967	0.7555	290.6	169.3	-
58	22	2075	Jun 28	09:55:35	147	933	P	-a	0.6897	1.5624	0.6220	283.4	157.0	-
59	23	2093	Jul 08	17:24:18	187	1156	P	-a	0.7632	1.4275	0.4872	275.3	141.9	-
60	24	2111	Jul 21	00:53:17	230	1379	P	-a	0.8362	1.2938	0.3530	266.3	123.2	-
61	25	2129	Jul 31	08:24:31	275	1602	P	-a	0.9070	1.1644	0.2224	256.5	99.7	-
62	26	2147	Aug 11	15:57:02	322	1825	P	-a	0.9765	1.0378	0.0941	245.8	66.0	-

63	27	2165	Aug 21	23:34:21	362	2048	N	-a	1.0417	0.9193	-0.0269	234.5	-	-
64	28	2183	Sep 02	07:15:22	403	2271	N	-a	1.1036	0.8072	-0.1419	222.7	-	-
65	29	2201	Sep 13	15:03:17	445	2494	N	-a	1.1597	0.7059	-0.2464	210.7	-	-
66	30	2219	Sep 24	22:55:52	490	2717	N	-a	1.2116	0.6125	-0.3435	198.5	-	-
67	31	2237	Oct 05	06:57:02	537	2940	N	-a	1.2563	0.5325	-0.4275	186.9	-	-
68	32	2255	Oct 16	15:04:25	587	3163	N	-a	1.2959	0.4621	-0.5021	175.7	-	-
69	33	2273	Oct 26	23:19:49	638	3386	N	-a	1.3288	0.4037	-0.5647	165.5	-	-
70	34	2291	Nov 07	07:41:44	691	3609	N	-a	1.3564	0.3553	-0.6174	156.4	-	-
71	35	2309	Nov 18	16:10:56	746	3832	N	-a	1.3782	0.3174	-0.6594	148.7	-	-
72	36	2327	Nov 30	00:45:50	804	4055	N	-a	1.3949	0.2887	-0.6920	142.6	-	-
73	37	2345	Dec 10	09:24:58	863	4278	N	-a	1.4083	0.2658	-0.7184	137.4	-	-
74	38	2363	Dec 21	18:08:30	925	4501	N	-a	1.4179	0.2498	-0.7376	133.8	-	-
75	39	2382	Jan 01	02:54:07	988	4724	N	-a	1.4262	0.2361	-0.7541	130.5	-	-
76	40	2400	Jan 12	11:40:47	1054	4947	N	-a	1.4330	0.2247	-0.7678	127.8	-	-
77	41	2418	Jan 22	20:25:46	1122	5170	N	-a	1.4410	0.2109	-0.7835	124.3	-	-
78	42	2436	Feb 03	05:08:57	1192	5393	N	-a	1.4502	0.1947	-0.8010	119.9	-	-
79	43	2454	Feb 13	13:48:10	1264	5616	N	-a	1.4626	0.1725	-0.8241	113.4	-	-
80	44	2472	Feb 24	22:21:41	1338	5839	N	-a	1.4791	0.1425	-0.8547	103.6	-	-
81	45	2490	Mar 07	06:48:56	1414	6062	N	-a	1.5004	0.1035	-0.8940	88.8	-	-
82	46	2508	Mar 18	15:08:38	1492	6285	N	-a	1.5273	0.0544	-0.9433	64.8	-	-

SAROS SERIES

122

Saros series 122 contains 74 lunar eclipses.

PHASE													
DURATIONS													
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-38	1022 Aug 14 14:51:42	1441 -12089	Nb	a-	1.5452	0.0087	-0.9639	25.6	-	-		
02	-37	1040 Aug 24 22:35:38	1349 -11866	N	a-	1.4885	0.1128	-0.8599	91.2	-	-		
03	-36	1058 Sep 05 06:27:56	1262 -11643	N	a-	1.4381	0.2055	-0.7676	121.8	-	-		
04	-35	1076 Sep 15 14:28:39	1179 -11420	N	a-	1.3941	0.2866	-0.6871	142.5	-	-		
05	-34	1094 Sep 26 22:38:25	1101 -11197	N	a-	1.3568	0.3555	-0.6191	157.4	-	-		
06	-33	1112 Oct 07 06:57:02	1028 -10974	N	a-	1.3264	0.4118	-0.5637	168.2	-	-		
07	-32	1130 Oct 18 15:22:48	958 -10751	N	a-	1.3014	0.4580	-0.5182	176.3	-	-		
08	-31	1148 Oct 28 23:56:59	893 -10528	N	a-	1.2830	0.4920	-0.4848	181.8	-	-		
09	-30	1166 Nov 09 08:37:08	832 -10305	N	a-	1.2696	0.5169	-0.4603	185.6	-	-		
10	-29	1184 Nov 19 17:23:21	774 -10082	N	a-	1.2607	0.5332	-0.4440	187.9	-	-		
11	-28	1202 Dec 01 02:11:52	721 -9859	N	a-	1.2534	0.5463	-0.4306	189.7	-	-		
12	-27	1220 Dec 11 11:03:49	670 -9636	N	a-	1.2491	0.5538	-0.4222	190.6	-	-		
13	-26	1238 Dec 22 19:55:49	623 -9413	N	a-	1.2449	0.5610	-0.4139	191.5	-	-		
14	-25	1257 Jan 02 04:47:00	580 -9190	N	a-	1.2402	0.5688	-0.4043	192.4	-	-		
15	-24	1275 Jan 13 13:35:00	539 -8967	N	a-	1.2330	0.5809	-0.3902	194.0	-	-		
16	-23	1293 Jan 23 22:19:22	500 -8744	N	a-	1.2230	0.5981	-0.3706	196.3	-	-		
17	-22	1311 Feb 04 06:58:29	465 -8521	N	a-	1.2089	0.6226	-0.3435	199.5	-	-		

18	-21	1329	Feb 14	15:30:42	431	-8298	N	a-	1.1896	0.6565	-0.3066	204.0	-	-
19	-20	1347	Feb 25	23:56:18	400	-8075	N	a-	1.1650	0.7002	-0.2600	209.6	-	-
20	-19	1365	Mar 08	08:14:22	370	-7852	N	a-	1.1345	0.7547	-0.2025	216.2	-	-
21	-18	1383	Mar 19	16:24:19	342	-7629	N	a-	1.0974	0.8213	-0.1330	223.9	-	-
22	-17	1401	Mar 30	00:26:41	316	-7406	N	a-	1.0541	0.8993	-0.0523	232.3	-	-
23	-16	1419	Apr 10	08:21:39	291	-7183	P	a-	1.0048	0.9886	0.0393	241.3	43.0	-
24	-15	1437	Apr 20	16:10:28	268	-6960	P	a-	0.9505	1.0873	0.1399	250.4	80.0	-
25	-14	1455	May 01	23:51:27	245	-6737	P	a-	0.8897	1.1981	0.2522	259.7	105.8	-
26	-13	1473	May 12	07:28:21	224	-6514	P	a-	0.8256	1.3153	0.3703	268.7	126.1	-
27	-12	1491	May 23	15:00:00	205	-6291	P	a-	0.7569	1.4411	0.4965	277.4	143.5	-
28	-11	1509	Jun 02	22:29:18	186	-6068	P	a-	0.6866	1.5702	0.6253	285.4	158.0	-
29	-10	1527	Jun 14	05:54:52	169	-5845	P	a-	0.6134	1.7051	0.7593	293.0	170.6	-
30	-09	1545	Jun 24	13:21:01	153	-5622	P	a-	0.5409	1.8389	0.8916	299.6	181.0	-
31	-08	1563	Jul 05	20:46:26	140	-5399	T	a-	0.4678	1.9741	1.0245	305.6	189.7	23.4
32	-07	1581	Jul 16	04:13:15	128	-5176	T	p-	0.3965	2.1064	1.1541	310.7	196.9	56.5
33	-06	1599	Aug 06	11:42:06	119	-4953	T	p-	0.3272	2.2353	1.2794	315.1	202.6	73.1
34	-05	1617	Aug 16	19:15:10	97	-4730	T+	p-	0.2621	2.3568	1.3970	318.8	207.0	83.7
35	-04	1635	Aug 28	02:53:01	71	-4507	T+	p-	0.2013	2.4706	1.5064	321.9	210.2	90.8
36	-03	1653	Sep 07	10:35:26	44	-4284	T+	pp	0.1448	2.5766	1.6076	324.4	212.6	95.4
37	-02	1671	Sep 18	18:25:15	22	-4061	T+	pp	0.0951	2.6705	1.6963	326.5	214.2	98.1
38	-01	1689	Sep 29	02:21:15	9	-3838	T+	pp	0.0509	2.7541	1.7747	328.2	215.2	99.5
39	00	1707	Oct 11	10:24:59	9	-3615	T+	pp	0.0139	2.8249	1.8400	329.7	215.8	100.1
40	01	1725	Oct 21	18:34:41	10	-3392	T-	pp	-0.0177	2.8206	1.8302	331.0	216.1	100.1
41	02	1743	Nov 02	02:52:32	12	-3169	T-	pp	-0.0421	2.7785	1.7829	332.3	216.4	99.7
42	03	1761	Nov 12	11:15:47	15	-2946	T-	p	-0.0614	2.7457	1.7449	333.5	216.6	99.3
43	04	1779	Nov 23	19:44:47	17	-2723	T-	p	-0.0752	2.7227	1.7172	334.8	216.8	98.9
44	05	1797	Dec 04	04:17:57	14	-2500	T-	p	-0.0850	2.7070	1.6971	336.0	217.0	98.6
45	06	1815	Dec 16	12:55:06	12	-2277	T-	p	-0.0906	2.6987	1.6850	337.2	217.4	98.4

46	07	1833	Dec 26	21:32:54	6	-2054	T-	-p	-0.0951	2.6920	1.6749	338.4	217.8	98.3
47	08	1852	Jan 07	06:10:44	7	-1831	T-	-p	-0.0991	2.6863	1.6663	339.6	218.2	98.3
48	09	1870	Jan 17	14:46:33	1	-1608	T-	-p	-0.1037	2.6789	1.6566	340.7	218.7	98.2
49	10	1888	Jan 28	23:20:01	-6	-1385	T-	-p	-0.1095	2.6692	1.6452	341.8	219.1	98.1
50	11	1906	Feb 09	07:46:58	5	-1162	T-	-p	-0.1199	2.6507	1.6254	342.8	219.4	97.8
51	12	1924	Feb 20	16:08:55	24	-939	T-	-p	-0.1338	2.6256	1.5995	343.6	219.7	97.1
52	13	1942	Mar 03	00:21:54	25	-716	T-	-p	-0.1545	2.5879	1.5612	344.3	219.7	95.9
53	14	1960	Mar 13	08:28:21	33	-493	T-	-p	-0.1799	2.5415	1.5145	344.8	219.4	94.0
54	15	1978	Mar 24	16:23:11	49	-270	T-	-p	-0.2140	2.4790	1.4518	344.9	218.5	90.7
55	16	1996	Apr 04	00:10:47	62	-47	T-	-p	-0.2534	2.4068	1.3795	344.7	217.1	85.8
56	17	2014	Apr 15	07:46:48	69	176	T	-a	-0.3017	2.3182	1.2907	343.9	214.7	77.8
57	18	2032	Apr 25	15:14:51	79	399	T	-a	-0.3558	2.2192	1.1913	342.4	211.2	65.5
58	19	2050	May 06	22:32:02	94	622	T	-h	-0.4181	2.1052	1.0767	340.0	206.0	43.2
59	20	2068	May 17	05:42:17	131	845	P	-t	-0.4851	1.9826	0.9532	336.6	199.0	-
60	21	2086	May 28	12:43:47	171	1068	P	-t	-0.5585	1.8486	0.8180	332.0	189.4	-
61	22	2104	Jun 08	19:38:40	213	1291	P	-t	-0.6362	1.7069	0.6746	325.9	176.8	-
62	23	2122	Jun 20	02:27:47	257	1514	P	-t	-0.7177	1.5584	0.5240	318.3	160.2	-
63	24	2140	Jun 30	09:13:17	303	1737	P	-t	-0.8012	1.4064	0.3695	308.9	138.2	-
64	25	2158	Jul 11	15:55:51	346	1960	P	-t	-0.8859	1.2525	0.2126	297.8	107.6	-
65	26	2176	Jul 21	22:36:52	386	2183	P	-t	-0.9707	1.0986	0.0553	284.6	56.3	-
66	27	2194	Aug 02	05:18:42	428	2406	N	-t	-1.0539	0.9479	-0.0993	269.6	-	-
67	28	2212	Aug 13	12:02:09	472	2629	N	-t	-1.1349	0.8015	-0.2499	252.6	-	-
68	29	2230	Aug 24	18:48:09	519	2852	N	-t	-1.2127	0.6610	-0.3950	233.5	-	-
69	30	2248	Sep 04	01:38:56	567	3075	N	-t	-1.2857	0.5294	-0.5314	212.4	-	-
70	31	2266	Sep 15	08:35:37	617	3298	N	-t	-1.3530	0.4086	-0.6573	189.3	-	-
71	32	2284	Sep 25	15:39:31	670	3521	N	-t	-1.4139	0.2994	-0.7716	164.2	-	-
72	33	2302	Oct 07	22:49:32	724	3744	N	-t	-1.4691	0.2007	-0.8754	136.1	-	-
73	34	2320	Oct 18	06:08:39	781	3967	N	-t	-1.5163	0.1166	-0.9645	104.8	-	-

SAROS SERIES

123

Saros series 123 contains 72 lunar eclipses.

													PHASE
													DURATIONS
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-36	1087 Aug 16 21:27:44	1132 -11285	Nb	a-	-1.5358	0.0343	-0.9548	51.8	-	-		
02	-35	1105 Aug 27 05:02:14	1056 -11062	N	h-	-1.4880	0.1251	-0.8699	98.6	-	-		
03	-34	1123 Sep 07 12:43:57	985 -10839	N	h-	-1.4464	0.2045	-0.7966	125.7	-	-		
04	-33	1141 Sep 17 20:32:05	918 -10616	N	h-	-1.4106	0.2734	-0.7340	145.1	-	-		
05	-32	1159 Sep 29 04:27:05	855 -10393	N	h-	-1.3809	0.3310	-0.6826	159.5	-	-		
06	-31	1177 Oct 09 12:29:21	797 -10170	N	h-	-1.3577	0.3766	-0.6431	170.1	-	-		
07	-30	1195 Oct 20 20:38:39	741 -9947	N	h-	-1.3406	0.4110	-0.6146	178.0	-	-		
08	-29	1213 Oct 31 04:53:28	690 -9724	N	h-	-1.3285	0.4361	-0.5951	183.6	-	-		

09	-28	1231	Nov 11	13:14:04	642	-9501	N	h-	-1.3215	0.4514	-0.5849	187.3	-	-
10	-27	1249	Nov 21	21:38:08	597	-9278	N	h-	-1.3179	0.4603	-0.5806	189.8	-	-
11	-26	1267	Dec 03	06:05:09	554	-9055	N	h-	-1.3174	0.4632	-0.5817	191.1	-	-
12	-25	1285	Dec 13	14:31:36	515	-8832	N	h-	-1.3172	0.4654	-0.5829	192.2	-	-
13	-24	1303	Dec 24	22:58:34	478	-8609	N	h-	-1.3179	0.4655	-0.5856	192.9	-	-
14	-23	1322	Jan 04	07:22:09	444	-8386	N	h-	-1.3164	0.4693	-0.5839	194.2	-	-
15	-22	1340	Jan 15	15:41:50	412	-8163	N	h-	-1.3126	0.4771	-0.5776	196.3	-	-
16	-21	1358	Jan 25	23:54:42	382	-7940	N	t-	-1.3040	0.4933	-0.5625	199.9	-	-
17	-20	1376	Feb 06	08:01:19	353	-7717	N	t-	-1.2911	0.5172	-0.5390	204.9	-	-
18	-19	1394	Feb 16	15:59:20	326	-7494	N	t-	-1.2718	0.5528	-0.5036	211.7	-	-
19	-18	1412	Feb 27	23:47:40	301	-7271	N	t-	-1.2454	0.6012	-0.4551	220.3	-	-
20	-17	1430	Mar 10	07:26:31	277	-7048	N	t-	-1.2119	0.6625	-0.3935	230.5	-	-
21	-16	1448	Mar 20	14:55:10	254	-6825	N	t-	-1.1709	0.7375	-0.3180	242.1	-	-
22	-15	1466	Mar 31	22:14:13	233	-6602	N	t-	-1.1226	0.8259	-0.2293	254.6	-	-
23	-14	1484	Apr 11	05:22:47	212	-6379	N	t-	-1.0662	0.9292	-0.1257	267.9	-	-
24	-13	1502	Apr 22	12:22:44	193	-6156	Nx	t-	-1.0034	1.0445	-0.0103	281.3	-	-
25	-12	1520	May 02	19:14:16	176	-5933	P	t-	-0.9344	1.1712	0.1162	294.6	81.5	-
26	-11	1538	May 14	01:58:00	159	-5710	P	t-	-0.8594	1.3090	0.2535	307.5	118.3	-
27	-10	1556	May 24	08:36:04	145	-5487	P	t-	-0.7802	1.4547	0.3983	319.6	145.4	-
28	-09	1574	Jun 04	15:09:13	132	-5264	P	t-	-0.6977	1.6068	0.5492	330.8	167.1	-
29	-08	1592	Jun 24	21:40:12	122	-5041	P	t-	-0.6135	1.7620	0.7029	340.7	184.6	-
30	-07	1610	Jul 06	04:08:03	107	-4818	P	t-	-0.5273	1.9212	0.8600	349.4	199.1	-
31	-06	1628	Jul 16	10:36:57	81	-4595	T	t-	-0.4424	2.0783	1.0147	356.8	210.5	19.9
32	-05	1646	Jul 27	17:06:36	54	-4372	T	t-	-0.3586	2.2335	1.1671	362.8	219.4	64.2
33	-04	1664	Aug 06	23:40:04	29	-4149	T	pp	-0.2779	2.3830	1.3135	367.6	226.0	83.5
34	-03	1682	Aug 18	06:17:12	13	-3926	T-	pp	-0.2006	2.5267	1.4538	371.2	230.7	95.0
35	-02	1700	Aug 29	13:01:24	8	-3703	T-	pp	-0.1291	2.6597	1.5833	373.8	233.7	101.7
36	-01	1718	Sep 09	19:52:29	10	-3480	T-	pp	-0.0635	2.7818	1.7017	375.5	235.3	105.0

37	00	1736 Sep 20 02:51:00	11	-3257	T-	pp	-0.0042	2.8925	1.8087	376.4	235.8	106.0
38	01	1754 Oct 01 09:58:28	14	-3034	T+	pp	0.0478	2.8144	1.7268	376.8	235.5	105.2
39	02	1772 Oct 11 17:14:41	16	-2811	T+	pp	0.0928	2.7337	1.6425	376.9	234.7	103.3
40	03	1790 Oct 23 00:40:41	16	-2588	T+	pp	0.1296	2.6678	1.5734	376.7	233.6	100.9
41	04	1808 Nov 03 08:13:38	12	-2365	T+	pp	0.1607	2.6121	1.5148	376.3	232.3	98.1
42	05	1826 Nov 14 15:56:14	9	-2142	T+	pp	0.1840	2.5707	1.4709	375.9	231.2	95.6
43	06	1844 Nov 24 23:44:52	6	-1919	T+	pp	0.2026	2.5375	1.4358	375.4	230.2	93.3
44	07	1862 Dec 06 07:40:21	7	-1696	T+	pp	0.2157	2.5141	1.4112	374.9	229.3	91.5
45	08	1880 Dec 16 15:39:03	-5	-1473	T+	pp	0.2263	2.4949	1.3914	374.4	228.6	89.9
46	09	1898 Dec 27 23:41:52	-4	-1250	T+	pp	0.2339	2.4809	1.3777	373.8	228.0	88.8
47	10	1917 Jan 08 07:44:48	19	-1027	T+	pp	0.2415	2.4663	1.3642	373.1	227.3	87.6
48	11	1935 Jan 19 15:47:35	24	-804	T+	pp	0.2498	2.4502	1.3499	372.1	226.7	86.3
49	12	1953 Jan 29 23:47:49	30	-581	T+	-p	0.2606	2.4291	1.3314	371.0	225.8	84.5
50	13	1971 Feb 10 07:45:21	41	-358	T	-p	0.2741	2.4026	1.3082	369.5	224.7	82.2
51	14	1989 Feb 20 15:36:18	56	-135	T	-p	0.2934	2.3651	1.2747	367.7	223.1	78.5
52	15	2007 Mar 03 23:21:59	65	88	T	-p	0.3175	2.3188	1.2328	365.4	221.1	73.4
53	16	2025 Mar 14 06:59:56	75	311	T	-p	0.3484	2.2595	1.1784	362.6	218.3	65.4
54	17	2043 Mar 25 14:32:04	87	534	T	-t	0.3849	2.1900	1.1142	359.3	214.6	53.4
55	18	2061 Apr 04 21:54:05	116	757	T	-t	0.4300	2.1044	1.0341	355.0	209.6	29.9
56	19	2079 Apr 16 05:10:45	155	980	P	-t	0.4799	2.0100	0.9451	350.1	203.4	-
57	20	2097 Apr 26 12:18:17	196	1203	P	-t	0.5377	1.9013	0.8420	344.0	195.2	-
58	21	2115 May 08 19:21:24	239	1426	P	-t	0.5996	1.7849	0.7311	336.9	185.0	-
59	22	2133 May 19 02:16:19	284	1649	P	-t	0.6688	1.6553	0.6067	328.4	171.6	-
60	23	2151 May 30 09:09:10	331	1872	P	-t	0.7403	1.5216	0.4780	318.6	155.1	-
61	24	2169 Jun 09 15:57:06	370	2095	P	-t	0.8158	1.3806	0.3416	307.2	133.5	-
62	25	2187 Jun 20 22:44:13	411	2318	P	-t	0.8928	1.2372	0.2025	294.4	104.6	-
63	26	2205 Jul 02 05:29:54	455	2541	P	-t	0.9713	1.0912	0.0603	279.8	58.0	-
64	27	2223 Jul 13 12:17:52	500	2764	N	-t	1.0485	0.9478	-0.0797	263.7	-	-

65	28	2241	Jul 23	19:08:10	548	2987	N	-t	1.1245	0.8071	-0.2177	245.9	-	-
66	29	2259	Aug 04	02:02:00	597	3210	N	-t	1.1981	0.6707	-0.3516	226.3	-	-
67	30	2277	Aug 14	09:01:20	649	3433	N	-t	1.2678	0.5419	-0.4785	205.3	-	-
68	31	2295	Aug 25	16:07:04	702	3656	N	-t	1.3328	0.4218	-0.5971	182.5	-	-
69	32	2313	Sep 05	23:20:24	758	3879	N	-t	1.3925	0.3118	-0.7061	158.0	-	-
70	33	2331	Sep 17	06:41:33	816	4102	N	-t	1.4465	0.2123	-0.8048	131.1	-	-
71	34	2349	Sep 27	14:12:31	876	4325	N	-h	1.4935	0.1259	-0.8907	101.4	-	-
72	35	2367	Oct 08	21:52:39	938	4548	N	-h	1.5336	0.0521	-0.9642	65.4	-	-

SAROS SERIES

124

Saros series 124 contains 73 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-34	1152	Aug 17	00:06:26	880	-10481	Nb t-	1.5433	0.0650	-1.0123	79.1	-	-	

02	-33	1170	Aug 28	07:00:31	819	-10258	N	t-	1.4807	0.1811	-0.8983	130.5	-	-
03	-32	1188	Sep 07	14:02:23	763	-10035	N	t-	1.4234	0.2874	-0.7943	162.8	-	-
04	-31	1206	Sep 18	21:15:39	710	-9812	N	t-	1.3744	0.3783	-0.7054	185.1	-	-
05	-30	1224	Sep 29	04:37:55	660	-9589	N	t-	1.3317	0.4577	-0.6281	201.9	-	-
06	-29	1242	Oct 10	12:09:48	614	-9366	N	t-	1.2959	0.5241	-0.5633	214.5	-	-
07	-28	1260	Oct 20	19:50:54	571	-9143	N	t-	1.2670	0.5778	-0.5110	223.8	-	-
08	-27	1278	Nov 01	03:41:09	530	-8920	N	t-	1.2453	0.6181	-0.4715	230.3	-	-
09	-26	1296	Nov 11	11:38:19	493	-8697	N	t-	1.2282	0.6497	-0.4402	235.0	-	-
10	-25	1314	Nov 22	19:41:06	457	-8474	N	t-	1.2152	0.6734	-0.4162	238.2	-	-
11	-24	1332	Dec 03	03:48:29	424	-8251	N	t-	1.2052	0.6911	-0.3975	240.4	-	-
12	-23	1350	Dec 14	11:59:03	393	-8028	N	h-	1.1975	0.7044	-0.3824	241.8	-	-
13	-22	1368	Dec 24	20:09:43	364	-7805	N	h-	1.1894	0.7181	-0.3662	243.1	-	-
14	-21	1387	Jan 05	04:20:25	337	-7582	N	h-	1.1807	0.7323	-0.3488	244.5	-	-
15	-20	1405	Jan 15	12:28:24	311	-7359	N	h-	1.1692	0.7514	-0.3257	246.4	-	-
16	-19	1423	Jan 26	20:33:05	286	-7136	N	h-	1.1544	0.7763	-0.2962	248.9	-	-
17	-18	1441	Feb 06	04:31:34	263	-6913	N	h-	1.1337	0.8117	-0.2557	252.7	-	-
18	-17	1459	Feb 17	12:25:19	241	-6690	N	h-	1.1084	0.8552	-0.2065	257.2	-	-
19	-16	1477	Feb 27	20:11:49	220	-6467	N	h-	1.0767	0.9104	-0.1454	262.7	-	-
20	-15	1495	Mar 11	03:50:59	201	-6244	N	h-	1.0379	0.9785	-0.0711	269.3	-	-
21	-14	1513	Mar 21	11:22:52	182	-6021	P	h-	0.9922	1.0591	0.0158	276.5	29.8	-
22	-13	1531	Apr 01	18:47:57	166	-5798	P	h-	0.9400	1.1518	0.1149	284.2	79.0	-
23	-12	1549	Apr 12	02:06:54	150	-5575	P	h-	0.8818	1.2555	0.2247	292.0	108.4	-
24	-11	1567	Apr 23	09:18:49	137	-5352	P	h-	0.8168	1.3716	0.3469	299.8	131.9	-
25	-10	1585	May 13	16:27:07	126	-5129	P	h-	0.7477	1.4955	0.4765	307.1	151.1	-
26	-09	1603	May 24	23:30:55	115	-4906	P	a-	0.6737	1.6287	0.6150	313.9	167.4	-
27	-08	1621	Jun 04	06:32:45	92	-4683	P	a-	0.5970	1.7670	0.7582	319.9	180.9	-
28	-07	1639	Jun 15	13:32:42	65	-4460	P	a-	0.5176	1.9103	0.9059	325.0	192.1	-
29	-06	1657	Jun 25	20:33:50	38	-4237	T	a-	0.4380	2.0545	1.0540	329.1	201.0	35.9

30	-05	1675	Jul 07	03:36:11	18	-4014	T	a-	0.3582	2.1991	1.2020	332.3	207.9	66.2
31	-04	1693	Jul 17	10:41:02	8	-3791	T	p-	0.2793	2.3426	1.3482	334.4	213.0	82.4
32	-03	1711	Jul 29	17:50:25	9	-3568	T+	p-	0.2032	2.4811	1.4889	335.7	216.4	92.2
33	-02	1729	Aug 09	01:05:17	11	-3345	T+	pp	0.1305	2.6136	1.6232	336.1	218.4	98.0
34	-01	1747	Aug 20	08:26:59	12	-3122	T+	pp	0.0627	2.7375	1.7484	335.8	219.1	100.8
35	00	1765	Aug 30	15:55:32	15	-2899	T-	pp	-0.0004	2.8513	1.8629	334.9	218.9	101.4
36	01	1783	Sep 10	23:33:06	17	-2676	T-	pp	-0.0569	2.7474	1.7595	333.6	217.9	100.4
37	02	1801	Sep 22	07:18:55	13	-2453	T-	pp	-0.1074	2.6548	1.6669	332.1	216.4	98.2
38	03	1819	Oct 03	15:13:28	12	-2230	T-	pp	-0.1510	2.5747	1.5868	330.4	214.5	95.3
39	04	1837	Oct 13	23:17:06	5	-2007	T-	p	-0.1878	2.5074	1.5192	328.6	212.6	92.0
40	05	1855	Oct 25	07:29:40	7	-1784	T-	p	-0.2177	2.4527	1.4643	327.0	210.8	88.7
41	06	1873	Nov 04	15:51:03	-2	-1561	T-	p	-0.2408	2.4104	1.4217	325.4	209.1	85.7
42	07	1891	Nov 16	00:18:46	-6	-1338	T-	p	-0.2592	2.3766	1.3880	324.0	207.6	83.1
43	08	1909	Nov 27	08:54:41	10	-1115	T-	p	-0.2712	2.3544	1.3660	322.8	206.5	81.2
44	09	1927	Dec 08	17:35:10	24	-892	T	p	-0.2796	2.3389	1.3510	321.8	205.6	79.8
45	10	1945	Dec 19	02:20:47	27	-669	T	p	-0.2845	2.3293	1.3424	320.9	204.9	78.9
46	11	1963	Dec 30	11:07:25	35	-446	T	p	-0.2889	2.3206	1.3350	320.0	204.3	78.1
47	12	1982	Jan 09	19:56:44	52	-223	T	p	-0.2916	2.3147	1.3310	319.1	203.8	77.7
48	13	2000	Jan 21	04:44:34	64	0	T	p	-0.2957	2.3060	1.3246	318.2	203.3	77.0
49	14	2018	Jan 31	13:31:00	71	223	T	p	-0.3014	2.2941	1.3155	317.2	202.7	76.1
50	15	2036	Feb 11	22:13:06	82	446	T	p	-0.3110	2.2751	1.2995	316.1	201.9	74.5
51	16	2054	Feb 22	06:51:27	101	669	T	p	-0.3242	2.2491	1.2769	314.7	200.9	72.1
52	17	2072	Mar 04	15:23:07	140	892	T	p	-0.3430	2.2127	1.2441	313.2	199.4	68.5
53	18	2090	Mar 15	23:48:31	180	1115	T	p	-0.3674	2.1659	1.2012	311.3	197.5	63.0
54	19	2108	Mar 27	08:06:28	222	1338	T	p	-0.3982	2.1076	1.1467	309.0	194.8	54.7
55	20	2126	Apr 07	16:17:55	266	1561	T	a	-0.4346	2.0390	1.0817	306.3	191.5	41.6
56	21	2144	Apr 18	00:20:29	313	1784	T	a	-0.4787	1.9563	1.0026	302.9	187.0	7.6
57	22	2162	Apr 29	08:17:08	354	2007	P	a	-0.5280	1.8642	0.9137	298.9	181.3	-

58	23	2180	May 09	16:05:58	395	2230	P	-a	-0.5840	1.7599	0.8124	294.1	173.9	-
59	24	2198	May 20	23:50:32	437	2453	P	-a	-0.6436	1.6493	0.7041	288.4	164.8	-
60	25	2216	Jun 01	07:27:36	482	2676	P	-a	-0.7097	1.5271	0.5839	281.6	153.0	-
61	26	2234	Jun 12	15:02:55	529	2899	P	-a	-0.7774	1.4022	0.4604	273.8	138.4	-
62	27	2252	Jun 22	22:33:27	577	3122	P	-a	-0.8494	1.2697	0.3286	264.6	119.3	-
63	28	2270	Jul 04	06:03:42	628	3345	P	-a	-0.9214	1.1374	0.1965	254.2	94.0	-
64	29	2288	Jul 14	13:31:30	681	3568	P	-a	-0.9954	1.0018	0.0604	242.3	53.1	-
65	30	2306	Jul 26	21:01:27	736	3791	N	-a	-1.0676	0.8701	-0.0725	229.2	-	-
66	31	2324	Aug 06	04:31:49	793	4014	N	-a	-1.1392	0.7395	-0.2050	214.5	-	-
67	32	2342	Aug 17	12:05:10	852	4237	N	-a	-1.2083	0.6140	-0.3328	198.2	-	-
68	33	2360	Aug 27	19:41:56	913	4460	N	-a	-1.2741	0.4947	-0.4551	180.3	-	-
69	34	2378	Sep 08	03:23:53	976	4683	N	-a	-1.3354	0.3840	-0.5691	160.9	-	-
70	35	2396	Sep 18	11:11:24	1042	4906	N	-a	-1.3918	0.2825	-0.6746	139.6	-	-
71	36	2414	Sep 29	19:04:37	1109	5129	N	-a	-1.4432	0.1902	-0.7710	115.8	-	-
72	37	2432	Oct 10	03:05:14	1179	5352	N	-a	-1.4883	0.1097	-0.8560	88.8	-	-
73	38	2450	Oct 21	11:12:18	1250	5575	N	-a	-1.5280	0.0391	-0.9312	53.5	-	-

SAROS SERIES

125

Saros series 125 contains 72 lunar eclipses.

													PHASE
													DURATIONS
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-36	1163 Jul 17 11:51:17	843 -10346	Nb	a-	-1.5011	0.0863	-0.8798	80.1	-	-		
02	-35	1181 Jul 27 19:19:16	785 -10123	N	a-	-1.4322	0.2124	-0.7529	123.8	-	-		
03	-34	1199 Aug 08 02:52:18	730 -9900	N	a-	-1.3665	0.3327	-0.6322	152.8	-	-		
04	-33	1217 Aug 18 10:33:44	679 -9677	N	a-	-1.3072	0.4417	-0.5234	173.9	-	-		
05	-32	1235 Aug 29 18:21:53	632 -9454	N	a-	-1.2528	0.5419	-0.4237	190.3	-	-		
06	-31	1253 Sep 09 02:19:22	587 -9231	N	a-	-1.2055	0.6290	-0.3374	202.9	-	-		
07	-30	1271 Sep 20 10:24:01	546 -9008	N	a-	-1.1637	0.7062	-0.2613	213.0	-	-		
08	-29	1289 Sep 30 18:38:31	507 -8785	N	a-	-1.1299	0.7689	-0.1998	220.5	-	-		
09	-28	1307 Oct 12 03:00:20	471 -8562	N	a-	-1.1017	0.8211	-0.1488	226.4	-	-		
10	-27	1325 Oct 22 11:30:16	437 -8339	N	a-	-1.0801	0.8613	-0.1097	230.6	-	-		
11	-26	1343 Nov 02 20:06:56	405 -8116	N	a-	-1.0639	0.8917	-0.0804	233.7	-	-		
12	-25	1361 Nov 13 04:49:55	375 -7893	N	a-	-1.0525	0.9129	-0.0598	235.7	-	-		
13	-24	1379 Nov 24 13:37:20	347 -7670	N	a-	-1.0449	0.9270	-0.0461	236.9	-	-		
14	-23	1397 Dec 04 22:27:28	321 -7447	N	a-	-1.0394	0.9371	-0.0359	237.8	-	-		
15	-22	1415 Dec 16 07:19:54	296 -7224	N	a-	-1.0357	0.9437	-0.0290	238.2	-	-		
16	-21	1433 Dec 26 16:12:40	272 -7001	N	a-	-1.0319	0.9502	-0.0215	238.7	-	-		
17	-20	1452 Jan 07 01:03:46	249 -6778	N	a-	-1.0269	0.9588	-0.0117	239.4	-	-		
18	-19	1470 Jan 17 09:51:49	228 -6555	P	a-	-1.0194	0.9718	0.0030	240.5	11.9	-		
19	-18	1488 Jan 28 18:35:29	208 -6332	P	a-	-1.0083	0.9911	0.0243	242.2	33.8	-		
20	-17	1506 Feb 08 03:14:07	189 -6109	P	a-	-0.9931	1.0177	0.0532	244.6	49.8	-		
21	-16	1524 Feb 19 11:45:16	172 -5886	P	a-	-0.9719	1.0554	0.0933	248.0	65.6	-		

22	-15	1542	Mar 01	20:10:00	156	-5663	P	a-	-0.9455	1.1026	0.1430	252.1	80.7	-
23	-14	1560	Mar 12	04:26:27	142	-5440	P	a-	-0.9127	1.1617	0.2045	257.1	95.8	-
24	-13	1578	Mar 23	12:35:23	130	-5217	P	a-	-0.8738	1.2318	0.2770	262.7	110.4	-
25	-12	1596	Apr 12	20:35:30	120	-4994	P	a-	-0.8278	1.3151	0.3623	268.9	124.8	-
26	-11	1614	Apr 24	04:28:48	102	-4771	P	a-	-0.7766	1.4083	0.4573	275.4	138.3	-
27	-10	1632	May 04	12:15:05	76	-4548	P	a-	-0.7196	1.5122	0.5625	282.1	151.1	-
28	-09	1650	May 15	19:54:19	48	-4325	P	a-	-0.6570	1.6265	0.6778	288.8	163.1	-
29	-08	1668	May 26	03:28:47	25	-4102	P	a-	-0.5909	1.7477	0.7993	295.2	173.8	-
30	-07	1686	Jun 06	10:58:28	10	-3879	P	a-	-0.5211	1.8759	0.9273	301.3	183.4	-
31	-06	1704	Jun 17	18:25:46	9	-3656	T	a-	-0.4494	2.0078	1.0583	306.8	191.7	35.7
32	-05	1722	Jun 29	01:49:16	10	-3433	T	p-	-0.3750	2.1452	1.1942	311.8	198.8	62.7
33	-04	1740	Jul 09	09:13:16	12	-3210	T	p-	-0.3014	2.2813	1.3281	316.1	204.5	78.0
34	-03	1758	Jul 20	16:36:44	14	-2987	T-	p-	-0.2279	2.4175	1.4615	319.7	208.9	88.3
35	-02	1776	Jul 31	00:02:02	17	-2764	T-	pp	-0.1566	2.5500	1.5907	322.7	212.2	94.9
36	-01	1794	Aug 11	07:29:21	15	-2541	T-	pp	-0.0874	2.6790	1.7157	324.9	214.3	98.8
37	00	1812	Aug 22	15:01:22	12	-2318	T-	pp	-0.0228	2.7998	1.8320	326.7	215.4	100.4
38	01	1830	Sep 02	22:37:55	7	-2095	T+	pp	0.0371	2.7760	1.8034	327.9	215.7	100.2
39	02	1848	Sep 13	06:19:25	7	-1872	T+	pp	0.0922	2.6776	1.6997	328.8	215.4	98.6
40	03	1866	Sep 24	14:07:14	4	-1649	T+	-p	0.1412	2.5904	1.6071	329.4	214.6	96.0
41	04	1884	Oct 04	22:01:55	-6	-1426	T+	-p	0.1839	2.5151	1.5260	329.9	213.5	92.6
42	05	1902	Oct 17	06:03:26	1	-1203	T+	-p	0.2201	2.4514	1.4566	330.4	212.3	88.8
43	06	1920	Oct 27	14:11:38	22	-980	T+	-p	0.2502	2.3992	1.3987	330.9	211.1	85.0
44	07	1938	Nov 07	22:26:42	24	-757	T	-p	0.2738	2.3585	1.3525	331.5	210.2	81.4
45	08	1956	Nov 18	06:48:16	32	-534	T	-p	0.2917	2.3285	1.3172	332.2	209.5	78.4
46	09	1974	Nov 29	15:14:07	45	-311	T	-p	0.3054	2.3057	1.2896	333.1	208.9	75.7
47	10	1992	Dec 09	23:45:05	59	-88	T	-p	0.3144	2.2915	1.2709	334.1	208.7	73.9
48	11	2010	Dec 21	08:18:04	67	135	T	-p	0.3214	2.2807	1.2561	335.1	208.7	72.3
49	12	2028	Dec 31	16:53:15	77	358	T	-p	0.3258	2.2742	1.2463	336.2	208.8	71.3

50	13	2047	Jan 12	01:26:14	90	581	T	-p	0.3317	2.2649	1.2341	337.2	208.9	70.0
51	14	2065	Jan 22	09:58:58	124	804	T	-p	0.3371	2.2561	1.2231	338.2	209.0	68.8
52	15	2083	Feb 02	18:26:46	164	1027	T	-p	0.3463	2.2400	1.2052	338.9	208.8	66.5
53	16	2101	Feb 14	02:50:00	205	1250	T	-a	0.3584	2.2184	1.1825	339.4	208.4	63.4
54	17	2119	Feb 25	11:05:13	249	1473	T	-a	0.3765	2.1857	1.1490	339.5	207.4	58.1
55	18	2137	Mar 07	19:13:43	294	1696	T	-a	0.3992	2.1441	1.1069	339.3	205.8	50.0
56	19	2155	Mar 19	03:12:45	339	1919	T	-a	0.4293	2.0892	1.0517	338.5	203.4	35.5
57	20	2173	Mar 29	11:02:23	379	2142	P	-a	0.4662	2.0215	0.9839	337.1	199.9	-
58	21	2191	Apr 09	18:42:01	420	2365	P	-a	0.5107	1.9399	0.9022	334.9	194.9	-
59	22	2209	Apr 21	02:12:20	464	2588	P	-h	0.5617	1.8464	0.8086	331.7	188.1	-
60	23	2227	May 02	09:32:27	510	2811	P	-t	0.6204	1.7388	0.7008	327.3	179.0	-
61	24	2245	May 12	16:43:42	558	3034	P	-t	0.6856	1.6194	0.5809	321.6	166.7	-
62	25	2263	May 23	23:46:25	608	3257	P	-t	0.7568	1.4891	0.4499	314.2	150.2	-
63	26	2281	Jun 03	06:42:43	660	3480	P	-t	0.8322	1.3513	0.3110	305.1	127.9	-
64	27	2299	Jun 14	13:31:01	714	3703	P	-t	0.9131	1.2036	0.1618	293.7	94.6	-
65	28	2317	Jun 25	20:15:57	770	3926	P	-t	0.9955	1.0533	0.0097	280.2	23.7	-
66	29	2335	Jul 07	02:55:54	829	4149	N	-t	1.0806	0.8983	-0.1476	263.8	-	-
67	30	2353	Jul 17	09:35:20	889	4372	N	-t	1.1652	0.7444	-0.3043	244.7	-	-
68	31	2371	Jul 28	16:11:29	951	4595	N	-t	1.2511	0.5884	-0.4635	221.7	-	-
69	32	2389	Aug 07	22:50:34	1016	4818	N	-t	1.3334	0.4392	-0.6162	194.9	-	-
70	33	2407	Aug 19	05:30:19	1082	5041	N	-t	1.4137	0.2939	-0.7656	162.1	-	-
71	34	2425	Aug 29	12:14:31	1151	5264	N	-t	1.4893	0.1572	-0.9064	120.4	-	-
72	35	2443	Sep 09	19:02:39	1222	5487	Ne	-t	1.5609	0.0281	-1.0399	51.7	-	-

SAROS SERIES

126

Saros series 126 contains 70 lunar eclipses.

													PHASE
													DURATIONS
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-35	1228 Jul 18 18:28:45	650	-9542	N	h-	1.4996	0.0982	-0.8858	87.1	-	-	
02	-34	1246 Jul 30 01:46:44	605	-9319	N	h-	1.4376	0.2144	-0.7746	128.0	-	-	
03	-33	1264 Aug 09 09:08:46	562	-9096	N	h-	1.3792	0.3244	-0.6701	156.5	-	-	
04	-32	1282 Aug 20 16:34:27	522	-8873	N	h-	1.3244	0.4279	-0.5725	178.9	-	-	
05	-31	1300 Aug 31 00:06:34	485	-8650	N	h-	1.2753	0.5211	-0.4854	196.5	-	-	
06	-30	1318 Sep 11 07:44:46	450	-8427	N	h-	1.2321	0.6037	-0.4092	210.8	-	-	
07	-29	1336 Sep 21 15:30:34	418	-8204	N	h-	1.1952	0.6745	-0.3447	222.3	-	-	
08	-28	1354 Oct 02 23:21:57	387	-7981	N	h-	1.1637	0.7355	-0.2900	231.8	-	-	
09	-27	1372 Oct 13 07:21:39	358	-7758	N	h-	1.1395	0.7830	-0.2487	239.1	-	-	
10	-26	1390 Oct 24 15:27:20	331	-7535	N	h-	1.1210	0.8200	-0.2176	244.9	-	-	
11	-25	1408 Nov 03 23:39:10	305	-7312	N	h-	1.1080	0.8465	-0.1965	249.2	-	-	
12	-24	1426 Nov 15 07:55:22	281	-7089	N	h-	1.0992	0.8652	-0.1830	252.5	-	-	
13	-23	1444 Nov 25 16:15:51	258	-6866	N	h-	1.0945	0.8762	-0.1764	254.8	-	-	

14	-22	1462	Dec 07	00:38:21	236	-6643	N	h-	1.0920	0.8826	-0.1738	256.5	-	-
15	-21	1480	Dec 17	09:00:49	216	-6420	N	h-	1.0903	0.8873	-0.1722	258.0	-	-
16	-20	1498	Dec 28	17:22:57	197	-6197	N	t-	1.0890	0.8911	-0.1710	259.3	-	-
17	-19	1517	Jan 08	01:41:58	179	-5974	N	t-	1.0862	0.8971	-0.1668	260.9	-	-
18	-18	1535	Jan 19	09:56:17	162	-5751	N	t-	1.0800	0.9092	-0.1560	263.1	-	-
19	-17	1553	Jan 29	18:03:50	147	-5528	N	t-	1.0690	0.9296	-0.1363	266.2	-	-
20	-16	1571	Feb 10	02:04:37	135	-5305	N	t-	1.0535	0.9582	-0.1079	270.2	-	-
21	-15	1589	Mar 02	09:56:49	124	-5082	N	t-	1.0319	0.9978	-0.0681	275.3	-	-
22	-14	1607	Mar 13	17:38:53	111	-4859	Nx	t-	1.0028	1.0510	-0.0145	281.6	-	-
23	-13	1625	Mar 24	01:11:28	86	-4636	P	t-	0.9665	1.1171	0.0524	289.0	55.0	-
24	-12	1643	Apr 04	08:33:34	59	-4413	P	t-	0.9222	1.1982	0.1341	297.3	87.2	-
25	-11	1661	Apr 14	15:46:19	34	-4190	P	t-	0.8708	1.2919	0.2286	306.2	112.5	-
26	-10	1679	Apr 25	22:48:29	15	-3967	P	t-	0.8115	1.4006	0.3379	315.6	134.9	-
27	-09	1697	May 06	05:42:53	8	-3744	P	t-	0.7461	1.5203	0.4581	324.9	154.5	-
28	-08	1715	May 18	12:28:52	10	-3521	P	t-	0.6739	1.6526	0.5906	334.1	172.1	-
29	-07	1733	May 28	19:08:10	11	-3298	P	t-	0.5966	1.7945	0.7324	342.8	187.6	-
30	-06	1751	Jun 09	01:41:59	13	-3075	P	t-	0.5150	1.9445	0.8819	350.7	200.8	-
31	-05	1769	Jun 19	08:11:40	16	-2852	T	t-	0.4302	2.1005	1.0372	357.6	211.9	31.5
32	-04	1787	Jun 30	14:39:32	17	-2629	T	t-	0.3440	2.2592	1.1947	363.5	220.8	68.6
33	-03	1805	Jul 11	21:04:52	12	-2406	T+	pp	0.2561	2.4214	1.3554	368.1	227.6	87.6
34	-02	1823	Jul 23	03:32:23	10	-2183	T+	pp	0.1699	2.5805	1.5124	371.6	232.3	98.6
35	-01	1841	Aug 02	10:00:51	5	-1960	T+	pp	0.0846	2.7381	1.6678	373.8	235.0	104.6
36	00	1859	Aug 13	16:34:26	7	-1737	T+	pp	0.0038	2.8877	1.8148	374.9	236.0	106.5
37	01	1877	Aug 23	23:11:35	-4	-1514	T-	pp	-0.0739	2.7606	1.6849	375.0	235.4	104.9
38	02	1895	Sep 04	05:56:52	-6	-1291	T-	pp	-0.1449	2.6317	1.5530	374.4	233.5	100.5
39	03	1913	Sep 15	12:48:19	15	-1068	T-	pp	-0.2109	2.5122	1.4304	373.0	230.5	93.5
40	04	1931	Sep 26	19:48:29	24	-845	T-	pp	-0.2698	2.4058	1.3208	371.2	226.9	84.2
41	05	1949	Oct 07	02:56:55	29	-622	T	-p	-0.3219	2.3118	1.2236	369.2	222.9	72.8

42	06	1967 Oct 18 10:15:48	38	-399	T	-t	-0.3653	2.2337	1.1426	367.1	218.9	59.8
43	07	1985 Oct 28 17:43:17	55	-176	T	-t	-0.4022	2.1673	1.0736	365.1	214.9	43.9
44	08	2003 Nov 09 01:19:38	64	47	T	-t	-0.4319	2.1139	1.0178	363.2	211.4	22.0
45	09	2021 Nov 19 09:04:06	73	270	P	-t	-0.4552	2.0720	0.9742	361.5	208.4	-
46	10	2039 Nov 30 16:56:28	85	493	P	-t	-0.4721	2.0418	0.9426	360.1	206.0	-
47	11	2057 Dec 11 00:53:38	109	716	P	-t	-0.4853	2.0178	0.9181	358.8	204.0	-
48	12	2075 Dec 22 08:55:55	148	939	P	-t	-0.4945	2.0008	0.9013	357.6	202.5	-
49	13	2094 Jan 01 17:00:06	188	1162	P	-t	-0.5024	1.9858	0.8871	356.5	201.2	-
50	14	2112 Jan 14 01:06:36	231	1385	P	-t	-0.5087	1.9735	0.8764	355.3	200.1	-
51	15	2130 Jan 24 09:10:19	276	1608	P	-t	-0.5173	1.9565	0.8619	353.7	198.7	-
52	16	2148 Feb 04 17:13:45	323	1831	P	-t	-0.5265	1.9380	0.8465	352.0	197.2	-
53	17	2166 Feb 15 01:11:40	363	2054	P	-t	-0.5402	1.9109	0.8233	349.8	194.9	-
54	18	2184 Feb 26 09:05:35	404	2277	P	-t	-0.5579	1.8762	0.7930	347.1	192.0	-
55	19	2202 Mar 09 16:51:36	447	2500	P	-t	-0.5824	1.8288	0.7505	343.6	187.8	-
56	20	2220 Mar 20 00:32:40	492	2723	P	-t	-0.6114	1.7728	0.6999	339.4	182.6	-
57	21	2238 Mar 31 08:05:25	539	2946	P	-t	-0.6477	1.7035	0.6362	334.3	175.6	-
58	22	2256 Apr 10 15:31:04	588	3169	P	-t	-0.6904	1.6221	0.5606	328.1	166.5	-
59	23	2274 Apr 21 22:48:59	639	3392	P	-t	-0.7401	1.5280	0.4723	320.8	154.6	-
60	24	2292 May 02 06:00:52	692	3615	P	-t	-0.7956	1.4233	0.3735	312.0	139.2	-
61	25	2310 May 14 13:06:26	748	3838	P	-t	-0.8566	1.3085	0.2643	301.8	118.7	-
62	26	2328 May 24 20:06:39	805	4061	P	-t	-0.9225	1.1848	0.1460	289.9	89.5	-
63	27	2346 Jun 05 03:03:17	865	4284	P	-t	-0.9921	1.0545	0.0209	276.2	34.4	-
64	28	2364 Jun 15 09:57:15	926	4507	N	-t	-1.0645	0.9192	-0.1097	260.4	-	-
65	29	2382 Jun 26 16:49:14	990	4730	N	-t	-1.1391	0.7802	-0.2444	242.3	-	-
66	30	2400 Jul 06 23:41:22	1056	4953	N	-t	-1.2140	0.6409	-0.3798	221.8	-	-
67	31	2418 Jul 18 06:34:23	1124	5176	N	-t	-1.2887	0.5020	-0.5153	198.1	-	-
68	32	2436 Jul 28 13:31:07	1194	5399	N	-t	-1.3610	0.3678	-0.6466	171.1	-	-
69	33	2454 Aug 08 20:30:20	1265	5622	N	-t	-1.4320	0.2364	-0.7757	138.2	-	-

SAROS SERIES

127

Saros series 127 contains 72 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-34	1275 Jul 09 14:25:50	538	-8961	Nb	t-	-1.5731	0.0064	-1.0631	25.0	-	-		
02	-33	1293 Jul 19 20:55:18	499	-8738	N	t-	-1.4918	0.1560	-0.9143	121.2	-	-		
03	-32	1311 Jul 31 03:29:38	464	-8515	N	t-	-1.4136	0.3000	-0.7713	165.8	-	-		
04	-31	1329 Aug 10 10:10:57	430	-8292	N	t-	-1.3403	0.4352	-0.6374	197.1	-	-		
05	-30	1347 Aug 21 16:59:59	399	-8069	N	t-	-1.2725	0.5603	-0.5137	220.8	-	-		
06	-29	1365 Aug 31 23:57:40	369	-7846	N	t-	-1.2107	0.6745	-0.4012	239.4	-	-		
07	-28	1383 Sep 12 07:04:45	342	-7623	N	t-	-1.1559	0.7760	-0.3013	253.9	-	-		
08	-27	1401 Sep 22 14:22:16	315	-7400	N	t-	-1.1084	0.8639	-0.2150	265.2	-	-		

09	-26	1419	Oct 03	21:50:05	291	-7177	N	t-	-1.0687	0.9374	-0.1428	273.8	-	-
10	-25	1437	Oct 14	05:26:54	267	-6954	N	t-	-1.0354	0.9990	-0.0824	280.4	-	-
11	-24	1455	Oct 25	13:13:24	245	-6731	Nx	t-	-1.0093	1.0475	-0.0348	285.1	-	-
12	-23	1473	Nov 04	21:08:23	224	-6508	P	t-	-0.9890	1.0849	0.0023	288.5	11.7	-
13	-22	1491	Nov 16	05:10:39	204	-6285	P	t-	-0.9741	1.1121	0.0298	290.6	41.7	-
14	-21	1509	Nov 26	13:18:02	186	-6062	P	h-	-0.9625	1.1329	0.0514	291.9	54.5	-
15	-20	1527	Dec 07	21:30:05	169	-5839	P	h-	-0.9540	1.1478	0.0678	292.6	62.3	-
16	-19	1545	Dec 18	05:45:01	153	-5616	P	h-	-0.9470	1.1596	0.0818	292.9	68.2	-
17	-18	1563	Dec 29	13:59:52	139	-5393	P	h-	-0.9392	1.1722	0.0975	293.1	74.1	-
18	-17	1582	Jan 08	22:14:15	128	-5170	P	a-	-0.9304	1.1866	0.1155	293.5	80.2	-
19	-16	1600	Jan 30	06:25:29	118	-4947	P	a-	-0.9183	1.2067	0.1399	294.2	87.7	-
20	-15	1618	Feb 09	14:33:24	97	-4724	P	a-	-0.9027	1.2327	0.1709	295.4	96.3	-
21	-14	1636	Feb 20	22:34:50	70	-4501	P	a-	-0.8810	1.2699	0.2135	297.3	106.7	-
22	-13	1654	Mar 03	06:31:30	43	-4278	P	a-	-0.8544	1.3156	0.2650	299.8	117.6	-
23	-12	1672	Mar 13	14:20:48	21	-4055	P	a-	-0.8210	1.3738	0.3293	303.0	129.5	-
24	-11	1690	Mar 24	22:03:03	9	-3832	P	a-	-0.7809	1.4443	0.4062	306.7	141.7	-
25	-10	1708	Apr 05	05:37:46	9	-3609	P	a-	-0.7337	1.5276	0.4959	310.9	154.0	-
26	-09	1726	Apr 16	13:06:31	10	-3386	P	a-	-0.6806	1.6220	0.5966	315.2	165.7	-
27	-08	1744	Apr 26	20:29:07	12	-3163	P	a-	-0.6212	1.7278	0.7086	319.6	176.8	-
28	-07	1762	May 08	03:45:37	15	-2940	P	a-	-0.5557	1.8449	0.8317	323.8	186.9	-
29	-06	1780	May 18	10:58:18	17	-2717	P	a-	-0.4862	1.9696	0.9620	327.5	195.8	-
30	-05	1798	May 29	18:07:26	14	-2494	T	a-	-0.4129	2.1015	1.0990	330.7	203.4	48.0
31	-04	1816	Jun 10	01:14:25	12	-2271	T	a-	-0.3368	2.2387	1.2410	333.2	209.5	71.3
32	-03	1834	Jun 21	08:19:45	6	-2048	T-	p-	-0.2583	2.3806	1.3871	335.0	214.2	85.6
33	-02	1852	Jul 01	15:26:13	7	-1825	T-	p-	-0.1799	2.5227	1.5330	335.9	217.4	94.6
34	-01	1870	Jul 12	22:34:23	0	-1602	T-	pp	-0.1023	2.6636	1.6769	336.0	219.1	99.7
35	00	1888	Jul 23	05:44:47	-6	-1379	T-	pp	-0.0256	2.8030	1.8189	335.3	219.5	101.8
36	01	1906	Aug 04	13:00:10	6	-1156	T+	pp	0.0477	2.7615	1.7793	333.9	218.7	101.2

37	02	1924 Aug 14 20:20:30	24	-933	T+	pp	0.1175	2.6326	1.6519	332.0	216.9	98.2
38	03	1942 Aug 26 03:48:25	26	-710	T+	pp	0.1818	2.5142	1.5344	329.5	214.2	93.4
39	04	1960 Sep 05 11:21:51	33	-487	T+	-p	0.2422	2.4031	1.4239	326.7	210.8	86.7
40	05	1978 Sep 16 19:05:01	49	-264	T	-p	0.2951	2.3060	1.3268	323.8	207.2	78.6
41	06	1996 Sep 27 02:55:24	62	-41	T	-p	0.3426	2.2188	1.2395	320.9	203.3	69.2
42	07	2014 Oct 08 10:55:44	69	182	T	-p	0.3826	2.1456	1.1659	318.1	199.5	58.8
43	08	2032 Oct 18 19:03:40	79	405	T	-p	0.4169	2.0830	1.1028	315.4	195.9	47.1
44	09	2050 Oct 30 03:21:47	95	628	T	-p	0.4435	2.0345	1.0538	313.1	192.9	34.5
45	10	2068 Nov 09 11:47:00	132	851	T	-p	0.4645	1.9962	1.0149	311.2	190.2	18.4
46	11	2086 Nov 20 20:19:42	172	1074	P	-p	0.4799	1.9679	0.9865	309.5	188.1	-
47	12	2104 Dec 02 04:58:11	214	1297	P	-a	0.4910	1.9476	0.9661	308.2	186.5	-
48	13	2122 Dec 13 13:42:41	258	1520	P	-a	0.4979	1.9349	0.9536	307.1	185.4	-
49	14	2140 Dec 23 22:29:48	304	1743	P	-a	0.5028	1.9255	0.9450	306.2	184.6	-
50	15	2159 Jan 04 07:19:20	347	1966	P	-a	0.5061	1.9189	0.9394	305.4	183.9	-
51	16	2177 Jan 14 16:08:55	387	2189	P	-a	0.5099	1.9112	0.9333	304.6	183.3	-
52	17	2195 Jan 26 00:58:49	429	2412	P	-a	0.5139	1.9028	0.9269	303.7	182.7	-
53	18	2213 Feb 06 09:44:33	474	2635	P	-a	0.5218	1.8872	0.9137	302.6	181.6	-
54	19	2231 Feb 17 18:27:46	520	2858	P	-a	0.5321	1.8669	0.8961	301.3	180.3	-
55	20	2249 Feb 28 03:04:45	568	3081	P	-a	0.5480	1.8362	0.8685	299.5	178.2	-
56	21	2267 Mar 11 11:37:14	619	3304	P	-a	0.5679	1.7981	0.8336	297.4	175.5	-
57	22	2285 Mar 21 20:01:07	671	3527	P	-a	0.5954	1.7459	0.7847	294.6	171.7	-
58	23	2303 Apr 03 04:19:40	726	3750	P	-a	0.6276	1.6851	0.7273	291.2	166.8	-
59	24	2321 Apr 13 12:29:34	782	3973	P	-a	0.6671	1.6109	0.6562	287.1	160.3	-
60	25	2339 Apr 24 20:32:43	841	4196	P	-a	0.7125	1.5262	0.5746	282.1	151.9	-
61	26	2357 May 05 04:27:44	902	4419	P	-a	0.7646	1.4292	0.4802	275.9	140.9	-
62	27	2375 May 16 12:17:12	965	4642	P	-a	0.8213	1.3240	0.3774	268.7	126.9	-
63	28	2393 May 26 20:00:14	1030	4865	P	-a	0.8834	1.2091	0.2643	260.2	108.0	-
64	29	2411 Jun 07 03:37:47	1097	5088	P	-a	0.9498	1.0866	0.1431	250.0	80.8	-

65	30	2429	Jun 17	11:11:33	1166	5311	P	-a	1.0191	0.9591	0.0164	238.3	27.8	-
66	31	2447	Jun 28	18:42:11	1237	5534	N	-a	1.0906	0.8279	-0.1147	224.6	-	-
67	32	2465	Jul 09	02:10:48	1310	5757	N	-a	1.1635	0.6943	-0.2489	208.7	-	-
68	33	2483	Jul 20	09:38:03	1385	5980	N	-a	1.2373	0.5595	-0.3848	190.1	-	-
69	34	2501	Jul 31	17:06:36	1463	6203	N	-a	1.3097	0.4276	-0.5184	168.6	-	-
70	35	2519	Aug 12	00:36:43	1542	6426	N	-a	1.3801	0.2995	-0.6489	143.1	-	-
71	36	2537	Aug 22	08:09:08	1624	6649	N	-a	1.4483	0.1758	-0.7756	111.1	-	-
72	37	2555	Sep 02	15:45:57	1707	6872	Ne	-a	1.5126	0.0596	-0.8952	65.5	-	-

SAROS SERIES

128

Saros series 128 contains 71 lunar eclipses.

PHASE													
DURATIONS													
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-36	1304 Jun 18 09:25:47	477	-8603	Nb a-	1.4896	0.1061	-0.8572	88.5	-	-		

02	-35	1322	Jun 29	16:45:29	443	-8380	N	a-	1.4140	0.2438	-0.7173	132.1	-	-
03	-34	1340	Jul 10	00:06:41	411	-8157	N	a-	1.3388	0.3810	-0.5785	162.6	-	-
04	-33	1358	Jul 21	07:33:39	381	-7934	N	a-	1.2675	0.5113	-0.4473	185.5	-	-
05	-32	1376	Jul 31	15:04:49	352	-7711	N	a-	1.1989	0.6370	-0.3213	204.0	-	-
06	-31	1394	Aug 11	22:42:10	325	-7488	N	a-	1.1347	0.7549	-0.2035	219.0	-	-
07	-30	1412	Aug 22	06:26:36	300	-7265	N	a-	1.0758	0.8633	-0.0957	231.2	-	-
08	-29	1430	Sep 02	14:18:56	276	-7042	P	a-	1.0229	0.9608	0.0008	241.1	6.3	-
09	-28	1448	Sep 12	22:19:32	253	-6819	P	a-	0.9764	1.0468	0.0854	249.0	63.3	-
10	-27	1466	Sep 24	06:28:03	232	-6596	P	a-	0.9362	1.1213	0.1585	255.4	85.3	-
11	-26	1484	Oct 04	14:45:35	212	-6373	P	a-	0.9031	1.1830	0.2185	260.3	99.2	-
12	-25	1502	Oct 15	23:10:40	193	-6150	P	a-	0.8759	1.2336	0.2675	264.1	108.8	-
13	-24	1520	Oct 26	07:43:02	175	-5927	P	a-	0.8549	1.2729	0.3053	266.9	115.5	-
14	-23	1538	Nov 06	16:22:02	159	-5704	P	a-	0.8392	1.3024	0.3334	268.9	120.1	-
15	-22	1556	Nov 17	01:06:54	145	-5481	P	a-	0.8286	1.3224	0.3523	270.2	123.0	-
16	-21	1574	Nov 28	09:55:43	132	-5258	P	a-	0.8213	1.3363	0.3655	271.1	125.0	-
17	-20	1592	Dec 18	18:46:58	122	-5035	P	a-	0.8160	1.3460	0.3749	271.7	126.4	-
18	-19	1610	Dec 30	03:39:54	106	-4812	P	a-	0.8124	1.3526	0.3817	272.1	127.3	-
19	-18	1629	Jan 09	12:32:47	81	-4589	P	a-	0.8092	1.3582	0.3877	272.4	128.2	-
20	-17	1647	Jan 20	21:23:09	53	-4366	P	a-	0.8039	1.3674	0.3979	273.0	129.7	-
21	-16	1665	Jan 31	06:10:20	29	-4143	P	a-	0.7963	1.3807	0.4124	273.9	131.8	-
22	-15	1683	Feb 11	14:52:35	12	-3920	P	a-	0.7848	1.4011	0.4345	275.2	134.9	-
23	-14	1701	Feb 22	23:29:56	8	-3697	P	a-	0.7695	1.4283	0.4634	277.0	138.8	-
24	-13	1719	Mar 06	07:59:13	10	-3474	P	a-	0.7478	1.4671	0.5043	279.5	143.9	-
25	-12	1737	Mar 16	16:22:12	11	-3251	P	a-	0.7211	1.5151	0.5542	282.5	149.9	-
26	-11	1755	Mar 28	00:36:25	14	-3028	P	a-	0.6871	1.5764	0.6176	286.2	156.8	-
27	-10	1773	Apr 07	08:43:30	16	-2805	P	a-	0.6476	1.6479	0.6909	290.2	164.1	-
28	-09	1791	Apr 18	16:41:28	16	-2582	P	a-	0.6008	1.7331	0.7776	294.7	171.8	-
29	-08	1809	Apr 30	00:33:02	12	-2359	P	a-	0.5490	1.8275	0.8733	299.3	179.4	-

30	-07	1827	May 11	08:16:57	9	-2136	P	a-	0.4910	1.9336	0.9801	304.0	186.8	-
31	-06	1845	May 21	15:54:30	6	-1913	T	a-	0.4281	2.0488	1.0957	308.6	193.7	45.3
32	-05	1863	Jun 01	23:26:14	7	-1690	T	p-	0.3605	2.1729	1.2195	312.9	199.9	66.1
33	-04	1881	Jun 12	06:53:44	-5	-1467	T	p-	0.2898	2.3031	1.3488	316.8	205.2	79.9
34	-03	1899	Jun 23	14:17:53	-3	-1244	T+	p-	0.2169	2.4376	1.4820	320.1	209.5	89.5
35	-02	1917	Jul 04	21:39:04	20	-1021	T+	pp	0.1419	2.5762	1.6185	322.9	212.8	96.0
36	-01	1935	Jul 16	05:00:05	24	-798	T+	pp	0.0672	2.7146	1.7542	325.0	214.8	99.6
37	00	1953	Jul 26	12:21:10	30	-575	T-	pp	-0.0071	2.8265	1.8628	326.5	215.7	100.7
38	01	1971	Aug 06	19:43:52	42	-352	T-	pp	-0.0794	2.6958	1.7283	327.3	215.5	99.4
39	02	1989	Aug 17	03:09:07	57	-129	T-	-p	-0.1490	2.5703	1.5984	327.5	214.3	95.8
40	03	2007	Aug 28	10:38:27	66	94	T-	-p	-0.2145	2.4526	1.4758	327.3	212.2	90.0
41	04	2025	Sep 07	18:12:58	75	317	T	-p	-0.2752	2.3440	1.3619	326.7	209.4	82.1
42	05	2043	Sep 19	01:51:50	88	540	T	-a	-0.3316	2.2433	1.2556	325.8	206.0	71.7
43	06	2061	Sep 29	09:38:13	117	763	T	-a	-0.3810	2.1556	1.1621	324.8	202.4	59.0
44	07	2079	Oct 10	17:30:30	156	986	T	-a	-0.4246	2.0786	1.0791	323.8	198.7	42.4
45	08	2097	Oct 21	01:30:55	197	1209	T	-a	-0.4608	2.0152	1.0097	323.1	195.2	15.2
46	09	2115	Nov 02	09:36:34	241	1432	P	-a	-0.4919	1.9611	0.9498	322.4	191.9	-
47	10	2133	Nov 12	17:50:08	286	1655	P	-a	-0.5157	1.9203	0.9033	322.2	189.3	-
48	11	2151	Nov 24	02:08:13	332	1878	P	-a	-0.5350	1.8875	0.8651	322.2	187.0	-
49	12	2169	Dec 04	10:31:58	371	2101	P	-a	-0.5488	1.8648	0.8375	322.5	185.3	-
50	13	2187	Dec 15	18:58:37	413	2324	P	-a	-0.5595	1.8473	0.8156	323.0	184.1	-
51	14	2205	Dec 27	03:28:47	456	2547	P	-a	-0.5665	1.8365	0.8008	323.8	183.4	-
52	15	2224	Jan 07	11:58:46	501	2770	P	-a	-0.5731	1.8260	0.7870	324.5	182.7	-
53	16	2242	Jan 17	20:28:26	549	2993	P	-a	-0.5794	1.8159	0.7742	325.2	182.2	-
54	17	2260	Jan 29	04:55:22	599	3216	P	-a	-0.5871	1.8028	0.7589	325.7	181.3	-
55	18	2278	Feb 08	13:19:10	650	3439	P	-a	-0.5965	1.7864	0.7409	326.0	180.2	-
56	19	2296	Feb 19	21:35:59	704	3662	P	-a	-0.6112	1.7600	0.7135	325.6	178.2	-
57	20	2314	Mar 03	05:46:48	760	3885	P	-a	-0.6301	1.7256	0.6784	324.8	175.3	-

58	21	2332	Mar 13	13:48:34	818	4108	P	-a	-0.6557	1.6788	0.6313	323.2	170.9	-
59	22	2350	Mar 24	21:42:58	878	4331	P	-h	-0.6865	1.6222	0.5747	320.9	165.1	-
60	23	2368	Apr 04	05:25:31	940	4554	P	-h	-0.7261	1.5496	0.5021	317.3	156.6	-
61	24	2386	Apr 15	12:59:59	1004	4777	P	-h	-0.7715	1.4663	0.4189	312.6	145.3	-
62	25	2404	Apr 25	20:22:55	1070	5000	P	-t	-0.8255	1.3670	0.3197	306.1	129.2	-
63	26	2422	May 07	03:37:48	1138	5223	P	-t	-0.8852	1.2576	0.2103	298.1	106.8	-
64	27	2440	May 17	10:41:49	1209	5446	P	-t	-0.9527	1.1339	0.0862	287.8	69.8	-
65	28	2458	May 28	17:39:26	1281	5669	Nx	-t	-1.0244	1.0025	-0.0456	275.2	-	-
66	29	2476	Jun 08	00:28:51	1355	5892	N	-t	-1.1019	0.8607	-0.1884	259.5	-	-
67	30	2494	Jun 19	07:12:41	1432	6115	N	-t	-1.1829	0.7127	-0.3375	240.4	-	-
68	31	2512	Jun 30	13:51:10	1511	6338	N	-t	-1.2672	0.5588	-0.4931	216.7	-	-
69	32	2530	Jul 11	20:27:10	1591	6561	N	-t	-1.3526	0.4032	-0.6507	187.3	-	-
70	33	2548	Jul 22	03:01:34	1674	6784	N	-t	-1.4381	0.2475	-0.8088	149.3	-	-
71	34	2566	Aug 02	09:35:06	1759	7007	Ne	-t	-1.5233	0.0927	-0.9665	92.9	-	-

SAROS SERIES

129

Saros series 129 contains 71 lunar eclipses.

													PHASE
													DURATIONS
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-36	1351 Jun 10 08:50:44	392 -8022	Nb h-	-1.5474	0.0079	-0.9709	24.8	-	-			
02	-35	1369 Jun 20 16:01:26	363 -7799	N h-	-1.4792	0.1346	-0.8474	101.7	-	-			
03	-34	1387 Jul 01 23:09:54	336 -7576	N h-	-1.4100	0.2635	-0.7222	141.3	-	-			
04	-33	1405 Jul 12 06:20:21	310 -7353	N h-	-1.3426	0.3894	-0.6007	170.4	-	-			
05	-32	1423 Jul 23 13:30:12	285 -7130	N h-	-1.2754	0.5152	-0.4798	194.6	-	-			
06	-31	1441 Aug 02 20:45:02	262 -6907	N t-	-1.2127	0.6328	-0.3675	214.1	-	-			
07	-30	1459 Aug 14 04:02:35	240 -6684	N t-	-1.1531	0.7452	-0.2609	230.9	-	-			
08	-29	1477 Aug 24 11:25:47	220 -6461	N t-	-1.0986	0.8482	-0.1639	244.9	-	-			
09	-28	1495 Sep 04 18:54:17	200 -6238	N t-	-1.0490	0.9425	-0.0759	256.9	-	-			
10	-27	1513 Sep 15 02:30:22	182 -6015	Nx t-	-1.0060	1.0245	-0.0003	266.8	-	-			
11	-26	1531 Sep 26 10:13:23	165 -5792	P t-	-0.9696	1.0946	0.0634	275.0	58.4	-			
12	-25	1549 Oct 06 18:02:25	150 -5569	P t-	-0.9388	1.1543	0.1168	281.9	78.9	-			
13	-24	1567 Oct 18 01:59:02	137 -5346	P t-	-0.9149	1.2012	0.1576	287.4	91.4	-			
14	-23	1585 Nov 07 10:01:47	126 -5123	P t-	-0.8965	1.2379	0.1885	291.8	99.8	-			
15	-22	1603 Nov 18 18:10:30	114 -4900	P t-	-0.8837	1.2641	0.2093	295.3	105.2	-			
16	-21	1621 Nov 29 02:23:01	91 -4677	P t-	-0.8746	1.2832	0.2237	298.1	108.8	-			
17	-20	1639 Dec 10 10:39:50	64 -4454	P t-	-0.8695	1.2946	0.2308	300.1	110.7	-			
18	-19	1657 Dec 20 18:58:00	38 -4231	P t-	-0.8661	1.3026	0.2353	301.9	112.0	-			
19	-18	1676 Jan 01 03:16:18	18 -4008	P t-	-0.8634	1.3091	0.2389	303.4	113.1	-			
20	-17	1694 Jan 11 11:33:05	8 -3785	P t-	-0.8598	1.3167	0.2444	305.0	114.6	-			
21	-16	1712 Jan 23 19:47:09	9 -3562	P t-	-0.8544	1.3274	0.2535	306.7	116.8	-			
22	-15	1730 Feb 03 03:55:45	11 -3339	P t-	-0.8451	1.3449	0.2702	308.9	120.6	-			
23	-14	1748 Feb 14 11:58:06	13 -3116	P t-	-0.8312	1.3706	0.2956	311.7	126.0	-			

24	-13	1766 Feb 24	19:52:51	15	-2893	P	t-	-0.8116	1.4065	0.3317	315.2	133.0	-
25	-12	1784 Mar 07	03:39:43	17	-2670	P	t-	-0.7858	1.4535	0.3792	319.4	141.5	-
26	-11	1802 Mar 19	11:15:28	13	-2447	P	t-	-0.7517	1.5156	0.4422	324.4	151.7	-
27	-10	1820 Mar 29	18:42:43	12	-2224	P	t-	-0.7112	1.5895	0.5171	330.0	162.4	-
28	-09	1838 Apr 10	01:58:48	5	-2001	P	t-	-0.6622	1.6788	0.6076	336.1	173.9	-
29	-08	1856 Apr 20	09:06:46	7	-1778	P	t-	-0.6068	1.7799	0.7098	342.3	185.1	-
30	-07	1874 May 01	16:03:17	-3	-1555	P	t-	-0.5426	1.8971	0.8282	348.7	196.2	-
31	-06	1892 May 11	22:53:20	-6	-1332	P	t-	-0.4734	2.0236	0.9555	354.7	206.3	-
32	-05	1910 May 24	05:34:16	11	-1109	T	t-	-0.3975	2.1625	1.0950	360.3	215.4	49.5
33	-04	1928 Jun 03	12:09:57	24	-886	T	tp	-0.3175	2.3092	1.2421	365.2	223.0	75.3
34	-03	1946 Jun 14	18:39:17	28	-663	T-	pp	-0.2324	2.4654	1.3983	369.2	229.0	91.1
35	-02	1964 Jun 25	01:06:50	35	-440	T-	pp	-0.1461	2.6238	1.5565	372.1	233.2	100.8
36	-01	1982 Jul 06	07:31:47	53	-217	T-	pp	-0.0579	2.7860	1.7179	373.8	235.6	105.7
37	00	2000 Jul 16	13:56:39	64	6	T+	pp	0.0302	2.8375	1.7684	374.4	236.0	106.4
38	01	2018 Jul 27	20:22:54	71	229	T+	pp	0.1168	2.6792	1.6087	373.8	234.5	103.0
39	02	2036 Aug 07	02:52:32	82	452	T+	pp	0.2004	2.5266	1.4544	372.1	231.3	95.3
40	03	2054 Aug 18	09:26:30	102	675	T	pp	0.2806	2.3805	1.3062	369.5	226.5	82.9
41	04	2072 Aug 28	16:05:42	141	898	T	-t	0.3563	2.2428	1.1662	366.0	220.3	64.2
42	05	2090 Sep 08	22:52:29	181	1121	T	-t	0.4257	2.1167	1.0377	362.0	213.1	31.9
43	06	2108 Sep 20	05:47:11	223	1344	P	-t	0.4884	2.0030	0.9213	357.6	205.1	-
44	07	2126 Oct 01	12:49:48	268	1567	P	-t	0.5446	1.9011	0.8169	353.1	196.7	-
45	08	2144 Oct 11	20:02:14	314	1790	P	-t	0.5930	1.8136	0.7269	348.7	188.3	-
46	09	2162 Oct 23	03:23:58	356	2013	P	-t	0.6340	1.7395	0.6504	344.6	180.3	-
47	10	2180 Nov 02	10:55:47	396	2236	P	-t	0.6669	1.6803	0.5891	341.0	173.2	-
48	11	2198 Nov 13	18:34:28	439	2459	P	-t	0.6944	1.6306	0.5378	337.7	166.7	-
49	12	2216 Nov 25	02:22:56	483	2682	P	-t	0.7144	1.5946	0.5005	335.1	161.6	-
50	13	2234 Dec 06	10:17:27	530	2905	P	-t	0.7300	1.5662	0.4715	332.8	157.3	-
51	14	2252 Dec 16	18:18:41	579	3128	P	-t	0.7406	1.5468	0.4522	331.0	154.3	-

52	15	2270	Dec 28	02:22:42	630	3351	P	-t	0.7493	1.5304	0.4364	329.3	151.7	-
53	16	2289	Jan 07	10:30:56	682	3574	P	-t	0.7552	1.5188	0.4263	327.8	149.9	-
54	17	2307	Jan 19	18:39:13	738	3797	P	-t	0.7616	1.5060	0.4156	326.1	148.0	-
55	18	2325	Jan 30	02:46:50	795	4020	P	-t	0.7692	1.4906	0.4033	324.2	145.8	-
56	19	2343	Feb 10	10:51:39	854	4243	P	-t	0.7796	1.4698	0.3860	321.7	142.8	-
57	20	2361	Feb 20	18:53:07	915	4466	P	-t	0.7931	1.4428	0.3633	318.7	138.7	-
58	21	2379	Mar 04	02:48:34	978	4689	P	-t	0.8120	1.4056	0.3310	314.8	132.8	-
59	22	2397	Mar 14	10:38:04	1044	4912	P	-t	0.8363	1.3584	0.2891	310.0	124.6	-
60	23	2415	Mar 25	18:20:36	1111	5135	P	-t	0.8667	1.2996	0.2360	304.0	113.1	-
61	24	2433	Apr 05	01:56:44	1181	5358	P	-t	0.9030	1.2300	0.1723	296.8	97.3	-
62	25	2451	Apr 16	09:23:54	1252	5581	P	-t	0.9471	1.1462	0.0945	287.9	72.7	-
63	26	2469	Apr 26	16:45:33	1326	5804	P	-t	0.9960	1.0533	0.0077	277.6	20.9	-
64	27	2487	May 07	23:59:40	1401	6027	N	-t	1.0516	0.9483	-0.0913	265.1	-	-
65	28	2505	May 19	07:09:44	1479	6250	N	-t	1.1112	0.8360	-0.1978	250.7	-	-
66	29	2523	May 30	14:13:13	1559	6473	N	-t	1.1767	0.7131	-0.3152	233.4	-	-
67	30	2541	Jun 09	21:15:08	1641	6696	N	-t	1.2440	0.5870	-0.4361	213.4	-	-
68	31	2559	Jun 21	04:13:10	1725	6919	N	-t	1.3146	0.4550	-0.5634	189.5	-	-
69	32	2577	Jul 01	11:11:08	1811	7142	N	-t	1.3860	0.3218	-0.6922	160.6	-	-
70	33	2595	Jul 12	18:08:13	1899	7365	N	-t	1.4585	0.1868	-0.8234	123.4	-	-
71	34	2613	Jul 24	01:08:17	1990	7588	Ne	-t	1.5292	0.0555	-0.9514	67.7	-	-

SAROS SERIES

130

Saros series 130 contains 71 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-34	1416 Jun 10 11:56:50	295 -7218	Nb t-	1.5632	0.0240 -1.0441	48.1	-	-					
02	-33	1434 Jun 21 18:20:00	271 -6995	N t-	1.4767	0.1822 -0.8850	130.6	-	-					
03	-32	1452 Jul 02 00:45:25	249 -6772	N t-	1.3910	0.3392 -0.7275	175.5	-	-					
04	-31	1470 Jul 13 07:13:12	228 -6549	N t-	1.3060	0.4950 -0.5715	208.7	-	-					
05	-30	1488 Jul 23 13:46:42	208 -6326	N t-	1.2247	0.6444 -0.4223	234.4	-	-					
06	-29	1506 Aug 03 20:24:30	189 -6103	N t-	1.1456	0.7897 -0.2776	255.4	-	-					
07	-28	1524 Aug 14 03:11:11	172 -5880	N t-	1.0728	0.9238 -0.1443	272.1	-	-					
08	-27	1542 Aug 25 10:04:53	156 -5657	Nx t-	1.0046	1.0495 -0.0196	285.8	-	-					
09	-26	1560 Sep 04 17:08:50	142 -5434	P t-	0.9440	1.1611 0.0910	296.6	72.8	-					
10	-25	1578 Sep 16 00:21:28	130 -5211	P t-	0.8897	1.2613 0.1901	305.2	103.5	-					
11	-24	1596 Oct 06 07:45:10	120 -4988	P t-	0.8436	1.3466 0.2743	311.8	122.6	-					
12	-23	1614 Oct 17 15:18:17	101 -4765	P t-	0.8043	1.4191 0.3458	316.8	135.9	-					
13	-22	1632 Oct 27 23:00:32	75 -4542	P t-	0.7718	1.4790 0.4051	320.5	145.4	-					
14	-21	1650 Nov 08 06:52:25	48 -4319	P t-	0.7464	1.5257 0.4515	323.1	152.0	-					
15	-20	1668 Nov 18 14:52:18	25 -4096	P h-	0.7274	1.5606 0.4865	324.6	156.6	-					
16	-19	1686 Nov 29 22:59:47	10 -3873	P h-	0.7134	1.5860 0.5126	325.4	159.7	-					
17	-18	1704 Dec 11 07:11:30	9 -3650	P a-	0.7023	1.6057 0.5336	325.7	162.0	-					

18	-17	1722 Dec 22 15:28:30	10	-3427	P	a-	0.6947	1.6187	0.5485	325.5	163.4	-
19	-16	1741 Jan 01 23:47:06	12	-3204	P	a-	0.6880	1.6297	0.5621	325.1	164.6	-
20	-15	1759 Jan 13 08:06:35	14	-2981	P	a-	0.6812	1.6404	0.5762	324.6	165.9	-
21	-14	1777 Jan 23 16:24:09	17	-2758	P	a-	0.6723	1.6547	0.5944	324.3	167.5	-
22	-13	1795 Feb 04 00:39:45	15	-2535	P	a-	0.6610	1.6732	0.6175	324.1	169.7	-
23	-12	1813 Feb 15 08:50:46	12	-2312	P	a-	0.6453	1.6993	0.6488	324.2	172.5	-
24	-11	1831 Feb 26 16:56:21	7	-2089	P	a-	0.6246	1.7346	0.6897	324.7	176.2	-
25	-10	1849 Mar 09 00:55:49	7	-1866	P	a-	0.5980	1.7804	0.7414	325.6	180.6	-
26	-09	1867 Mar 20 08:49:01	4	-1643	P	a-	0.5656	1.8366	0.8038	326.8	185.5	-
27	-08	1885 Mar 30 16:34:07	-6	-1420	P	a-	0.5257	1.9066	0.8802	328.4	191.0	-
28	-07	1903 Apr 12 00:12:59	2	-1197	P	a-	0.4798	1.9877	0.9677	330.1	196.5	-
29	-06	1921 Apr 22 07:44:39	22	-974	T	a-	0.4269	2.0816	1.0678	331.9	202.0	40.1
30	-05	1939 May 03 15:11:43	24	-751	T	a-	0.3693	2.1842	1.1765	333.5	207.1	62.4
31	-04	1957 May 13 22:31:28	32	-528	T	a-	0.3045	2.3001	1.2982	335.0	211.6	77.6
32	-03	1975 May 25 05:48:47	46	-305	T+	p-	0.2367	2.4218	1.4253	335.9	215.2	88.3
33	-02	1993 Jun 04 13:01:26	59	-82	T+	p-	0.1638	2.5532	1.5617	336.3	217.8	95.8
34	-01	2011 Jun 15 20:13:43	67	141	T+	pp	0.0897	2.6868	1.6999	336.1	219.3	100.2
35	00	2029 Jun 26 03:23:22	77	364	T+	pp	0.0124	2.8266	1.8436	335.1	219.5	101.9
36	01	2047 Jul 07 10:35:45	91	587	T-	pp	-0.0636	2.7310	1.7513	333.4	218.5	100.8
37	02	2065 Jul 17 17:48:40	125	810	T-	pp	-0.1402	2.5890	1.6121	331.0	216.3	97.0
38	03	2083 Jul 29 01:05:34	165	1033	T-	pp	-0.2143	2.4520	1.4773	328.0	212.9	90.4
39	04	2101 Aug 09 08:25:33	206	1256	T	-p	-0.2864	2.3189	1.3458	324.4	208.4	80.7
40	05	2119 Aug 20 15:51:55	250	1479	T	-p	-0.3538	2.1946	1.2227	320.3	203.1	67.3
41	06	2137 Aug 30 23:24:05	296	1702	T	-p	-0.4171	2.0782	1.1069	315.9	197.1	48.3
42	07	2155 Sep 11 07:03:11	340	1925	T	-a	-0.4752	1.9715	1.0003	311.4	190.7	2.6
43	08	2173 Sep 21 14:50:18	380	2148	P	-a	-0.5272	1.8761	0.9047	306.9	184.0	-
44	09	2191 Oct 02 22:45:48	422	2371	P	-a	-0.5729	1.7925	0.8206	302.6	177.4	-
45	10	2209 Oct 14 06:49:53	465	2594	P	-a	-0.6119	1.7214	0.7487	298.6	171.1	-

46	11	2227	Oct 25	15:02:23	511	2817	P	-a	-0.6444	1.6621	0.6886	295.1	165.4	-
47	12	2245	Nov 04	23:23:16	559	3040	P	-a	-0.6707	1.6143	0.6399	292.0	160.4	-
48	13	2263	Nov 16	07:52:13	609	3263	P	-a	-0.6908	1.5778	0.6027	289.5	156.3	-
49	14	2281	Nov 26	16:27:11	661	3486	P	-a	-0.7064	1.5494	0.5737	287.5	153.0	-
50	15	2299	Dec 08	01:09:08	716	3709	P	-a	-0.7167	1.5307	0.5547	286.0	150.6	-
51	16	2317	Dec 19	09:55:14	772	3932	P	-a	-0.7237	1.5180	0.5419	284.9	149.0	-
52	17	2335	Dec 30	18:45:24	830	4155	P	-a	-0.7278	1.5101	0.5345	284.0	148.0	-
53	18	2354	Jan 10	03:35:57	891	4378	P	-a	-0.7321	1.5020	0.5271	283.2	147.0	-
54	19	2372	Jan 21	12:27:44	953	4601	P	-a	-0.7353	1.4953	0.5218	282.4	146.2	-
55	20	2390	Jan 31	21:17:34	1018	4824	P	-a	-0.7404	1.4853	0.5133	281.5	145.1	-
56	21	2408	Feb 12	06:04:35	1084	5047	P	-a	-0.7479	1.4704	0.5006	280.2	143.5	-
57	22	2426	Feb 22	14:46:52	1153	5270	P	-a	-0.7594	1.4481	0.4805	278.5	140.9	-
58	23	2444	Mar 04	23:24:12	1224	5493	P	-a	-0.7754	1.4175	0.4526	276.3	137.3	-
59	24	2462	Mar 16	07:55:14	1296	5716	P	-a	-0.7966	1.3771	0.4150	273.3	132.2	-
60	25	2480	Mar 26	16:18:42	1371	5939	P	-a	-0.8242	1.3251	0.3659	269.5	125.1	-
61	26	2498	Apr 07	00:35:16	1448	6162	P	-a	-0.8576	1.2623	0.3058	264.8	115.3	-
62	27	2516	Apr 18	08:44:26	1527	6385	P	-a	-0.8975	1.1879	0.2341	258.9	102.0	-
63	28	2534	Apr 29	16:45:47	1608	6608	P	-a	-0.9439	1.1015	0.1502	251.6	82.7	-
64	29	2552	May 10	00:40:14	1692	6831	P	-a	-0.9961	1.0046	0.0554	242.8	50.9	-
65	30	2570	May 21	08:28:02	1777	7054	N	-a	-1.0538	0.8977	-0.0497	232.2	-	-
66	31	2588	May 31	16:10:46	1864	7277	N	-a	-1.1157	0.7836	-0.1626	219.7	-	-
67	32	2606	Jun 12	23:46:43	1954	7500	N	-a	-1.1830	0.6597	-0.2858	204.3	-	-
68	33	2624	Jun 23	07:19:46	2045	7723	N	-a	-1.2525	0.5322	-0.4131	186.0	-	-
69	34	2642	Jul 04	14:48:51	2139	7946	N	-a	-1.3251	0.3991	-0.5466	163.4	-	-
70	35	2660	Jul 14	22:16:53	2234	8169	N	-a	-1.3979	0.2661	-0.6807	135.3	-	-
71	36	2678	Jul 26	05:42:41	2332	8392	N	-a	-1.4721	0.1308	-0.8178	96.2	-	-

SAROS SERIES

131

Saros series 131 contains 72 lunar eclipses.

PHASE													
DURATIONS													
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-37	1427 May 10 23:39:25	280	-7083	Nb	a-	-1.5427	0.0112	-0.9572	29.1	-	-	
02	-36	1445 May 21 07:02:27	258	-6860	N	a-	-1.4705	0.1417	-0.8227	101.9	-	-	
03	-35	1463 Jun 01 14:23:22	236	-6637	N	a-	-1.3957	0.2771	-0.6837	140.3	-	-	
04	-34	1481 Jun 11 21:44:03	215	-6414	N	a-	-1.3201	0.4144	-0.5435	168.9	-	-	
05	-33	1499 Jun 23 05:05:35	196	-6191	N	a-	-1.2445	0.5520	-0.4037	191.8	-	-	
06	-32	1517 Jul 03 12:28:24	178	-5968	N	a-	-1.1693	0.6892	-0.2648	210.9	-	-	
07	-31	1535 Jul 14 19:54:01	162	-5745	N	a-	-1.0956	0.8239	-0.1292	226.9	-	-	
08	-30	1553 Jul 25 03:24:11	147	-5522	P	a-	-1.0253	0.9528	0.0001	240.2	2.5	-	
09	-29	1571 Aug 05 10:59:42	134	-5299	P	a-	-0.9591	1.0743	0.1215	251.3	75.3	-	
10	-28	1589 Aug 25 18:40:24	124	-5076	P	a-	-0.8969	1.1887	0.2352	260.7	102.9	-	

11	-27	1607 Sep 06 02:28:42	110	-4853	P	a-	-0.8407	1.2923	0.3378	268.3	121.3	-
12	-26	1625 Sep 16 10:24:16	86	-4630	P	a-	-0.7904	1.3855	0.4295	274.6	134.8	-
13	-25	1643 Sep 27 18:28:14	58	-4407	P	a-	-0.7468	1.4663	0.5085	279.6	144.7	-
14	-24	1661 Oct 08 02:39:03	33	-4184	P	a-	-0.7089	1.5370	0.5771	283.7	152.4	-
15	-23	1679 Oct 19 10:58:53	14	-3961	P	a-	-0.6784	1.5940	0.6321	286.9	158.0	-
16	-22	1697 Oct 29 19:25:59	8	-3738	P	a-	-0.6537	1.6404	0.6764	289.3	162.1	-
17	-21	1715 Nov 11 04:00:14	10	-3515	P	a-	-0.6347	1.6760	0.7102	291.1	165.1	-
18	-20	1733 Nov 21 12:40:54	11	-3292	P	a-	-0.6211	1.7020	0.7344	292.5	167.2	-
19	-19	1751 Dec 02 21:26:52	13	-3069	P	a-	-0.6116	1.7202	0.7512	293.4	168.5	-
20	-18	1769 Dec 13 06:17:04	16	-2846	P	a-	-0.6058	1.7312	0.7611	294.0	169.4	-
21	-17	1787 Dec 24 15:08:29	16	-2623	P	a-	-0.6010	1.7405	0.7696	294.5	170.1	-
22	-16	1806 Jan 05 00:02:04	12	-2400	P	a-	-0.5981	1.7459	0.7748	294.8	170.5	-
23	-15	1824 Jan 16 08:54:09	10	-2177	P	a-	-0.5937	1.7538	0.7829	295.3	171.2	-
24	-14	1842 Jan 26 17:44:27	5	-1954	P	a-	-0.5884	1.7634	0.7930	295.9	172.1	-
25	-13	1860 Feb 07 02:29:45	8	-1731	P	a-	-0.5790	1.7801	0.8106	296.8	173.7	-
26	-12	1878 Feb 17 11:11:05	-5	-1508	P	a-	-0.5667	1.8021	0.8338	297.9	175.6	-
27	-11	1896 Feb 28 19:45:40	-6	-1285	P	a-	-0.5488	1.8342	0.8673	299.5	178.2	-
28	-10	1914 Mar 12 04:13:08	16	-1062	P	a-	-0.5254	1.8764	0.9111	301.5	181.5	-
29	-09	1932 Mar 22 12:32:39	24	-839	P	a-	-0.4956	1.9303	0.9666	303.8	185.3	-
30	-08	1950 Apr 02 20:44:34	29	-616	T	a-	-0.4598	1.9951	1.0329	306.5	189.6	26.9
31	-07	1968 Apr 13 04:48:01	39	-393	T	p-	-0.4173	2.0725	1.1116	309.5	194.1	48.5
32	-06	1986 Apr 24 12:43:30	55	-170	T	p-	-0.3682	2.1620	1.2022	312.6	198.8	63.6
33	-05	2004 May 04 20:31:17	65	53	T	p-	-0.3132	2.2627	1.3035	315.7	203.2	75.5
34	-04	2022 May 16 04:12:42	73	276	T-	p-	-0.2532	2.3726	1.4137	318.7	207.2	84.9
35	-03	2040 May 26 11:46:22	85	499	T-	p-	-0.1872	2.4938	1.5348	321.4	210.7	92.2
36	-02	2058 Jun 06 19:15:48	110	722	T-	pp	-0.1181	2.6210	1.6611	323.6	213.4	97.3
37	-01	2076 Jun 17 02:39:47	149	945	T-	pp	-0.0452	2.7554	1.7943	325.3	215.1	100.2
38	00	2094 Jun 28 10:01:57	190	1168	T+	pp	0.0288	2.7865	1.8234	326.5	215.7	100.6

39	01	2112 Jul 09 17:19:51	232	1391	T+	pp	0.1055	2.6471	1.6814	326.9	215.1	98.4
40	02	2130 Jul 21 00:38:56	277	1614	T+	-p	0.1803	2.5114	1.5426	326.6	213.4	93.5
41	03	2148 Jul 31 07:56:37	324	1837	T+	-p	0.2554	2.3755	1.4030	325.7	210.4	85.3
42	04	2166 Aug 11 15:17:07	364	2060	T	-a	0.3273	2.2456	1.2688	324.1	206.3	73.3
43	05	2184 Aug 21 22:38:35	405	2283	T	-a	0.3977	2.1190	1.1374	321.9	201.0	54.8
44	06	2202 Sep 03 06:05:57	448	2506	T	-a	0.4622	2.0031	1.0163	319.5	194.9	19.6
45	07	2220 Sep 13 13:36:52	493	2729	P	-a	0.5228	1.8948	0.9023	316.6	188.0	-
46	08	2238 Sep 24 21:14:02	540	2952	P	-a	0.5775	1.7975	0.7992	313.7	180.6	-
47	09	2256 Oct 05 04:57:13	589	3175	P	-a	0.6264	1.7108	0.7064	310.9	173.0	-
48	10	2274 Oct 16 12:48:09	641	3398	P	-a	0.6683	1.6369	0.6264	308.3	165.5	-
49	11	2292 Oct 26 20:45:26	694	3621	P	-a	0.7041	1.5743	0.5577	306.0	158.3	-
50	12	2310 Nov 08 04:49:17	749	3844	P	-a	0.7339	1.5227	0.5001	304.2	151.8	-
51	13	2328 Nov 18 12:59:37	807	4067	P	-a	0.7574	1.4824	0.4541	302.9	146.1	-
52	14	2346 Nov 29 21:15:59	866	4290	P	-a	0.7756	1.4517	0.4180	302.1	141.3	-
53	15	2364 Dec 10 05:36:17	928	4513	P	-a	0.7898	1.4281	0.3895	301.8	137.4	-
54	16	2382 Dec 21 14:00:40	992	4736	P	-a	0.8002	1.4114	0.3684	301.8	134.4	-
55	17	2400 Dec 31 22:26:34	1058	4959	P	-a	0.8085	1.3980	0.3512	301.9	132.0	-
56	18	2419 Jan 12 06:53:23	1126	5182	P	-a	0.8154	1.3869	0.3369	302.2	129.9	-
57	19	2437 Jan 22 15:17:33	1195	5405	P	-a	0.8239	1.3726	0.3201	302.2	127.3	-
58	20	2455 Feb 02 23:40:14	1267	5628	P	-a	0.8331	1.3567	0.3023	302.0	124.4	-
59	21	2473 Feb 13 07:57:35	1342	5851	P	-a	0.8462	1.3335	0.2776	301.1	120.0	-
60	22	2491 Feb 24 16:09:26	1418	6074	P	-a	0.8630	1.3030	0.2463	299.6	113.8	-
61	23	2509 Mar 08 00:13:07	1496	6297	P	-h	0.8858	1.2614	0.2042	297.0	104.6	-
62	24	2527 Mar 19 08:09:29	1576	6520	P	-h	0.9140	1.2096	0.1524	293.3	91.3	-
63	25	2545 Mar 29 15:56:33	1659	6743	P	-h	0.9493	1.1448	0.0878	288.1	70.1	-
64	26	2563 Apr 09 23:33:33	1743	6966	P	-t	0.9919	1.0664	0.0097	281.2	23.7	-
65	27	2581 Apr 20 07:01:04	1830	7189	N	-t	1.0414	0.9755	-0.0809	272.2	-	-
66	28	2599 May 01 14:18:45	1918	7412	N	-t	1.0978	0.8717	-0.1843	260.8	-	-

67	29	2617	May 12	21:27:24	2009	7635	N	-t	1.1607	0.7562	-0.2996	246.3	-	-
68	30	2635	May 24	04:26:35	2102	7858	N	-t	1.2304	0.6284	-0.4273	228.0	-	-
69	31	2653	Jun 03	11:18:15	2196	8081	N	-t	1.3049	0.4919	-0.5641	204.8	-	-
70	32	2671	Jun 14	18:03:01	2293	8304	N	-t	1.3835	0.3478	-0.7088	175.0	-	-
71	33	2689	Jun 25	00:41:31	2392	8527	N	-t	1.4660	0.1969	-0.8606	133.8	-	-
72	34	2707	Jul 07	07:16:15	2493	8750	Ne	-t	1.5504	0.0428	-1.0160	63.4	-	-

SAROS SERIES

132

Saros series 132 contains 71 lunar eclipses.

													PHASE
													DURATIONS
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-35	1492 May 12	06:21:14	204	-6279	Nb a-	1.5337	0.0347	-0.9474	52.0	-	-	
02	-34	1510 May 23	13:38:07	185	-6056	N h-	1.4701	0.1523	-0.8316	108.1	-	-	
03	-33	1528 Jun 02	20:49:34	168	-5833	N h-	1.4025	0.2775	-0.7088	144.9	-	-	

04	-32	1546	Jun 14	03:57:38	153	-5610	N	h-	1.3329	0.4067	-0.5824	174.0	-	-
05	-31	1564	Jun 24	11:03:08	139	-5387	N	h-	1.2616	0.5393	-0.4534	198.6	-	-
06	-30	1582	Jul 05	18:08:00	127	-5164	N	t-	1.1903	0.6722	-0.3245	219.8	-	-
07	-29	1600	Jul 26	01:13:18	118	-4941	N	t-	1.1200	0.8035	-0.1978	238.3	-	-
08	-28	1618	Aug 06	08:19:44	96	-4718	N	t-	1.0513	0.9321	-0.0743	254.4	-	-
09	-27	1636	Aug 16	15:29:55	69	-4495	P	t-	0.9861	1.0545	0.0426	268.4	47.8	-
10	-26	1654	Aug 27	22:44:01	42	-4272	P	t-	0.9246	1.1704	0.1526	280.5	89.3	-
11	-25	1672	Sep 07	06:03:27	21	-4049	P	t-	0.8681	1.2770	0.2531	291.0	113.7	-
12	-24	1690	Sep 18	13:28:36	9	-3826	P	t-	0.8169	1.3742	0.3440	300.0	131.2	-
13	-23	1708	Sep 29	21:01:05	9	-3603	P	t-	0.7725	1.4590	0.4224	307.5	144.1	-
14	-22	1726	Oct 11	04:40:33	10	-3380	P	t-	0.7341	1.5326	0.4897	314.0	154.0	-
15	-21	1744	Oct 21	12:26:28	12	-3157	P	t-	0.7016	1.5954	0.5462	319.4	161.7	-
16	-20	1762	Nov 01	20:19:49	15	-2934	P	t-	0.6759	1.6455	0.5905	323.8	167.4	-
17	-19	1780	Nov 12	04:19:52	17	-2711	P	t-	0.6565	1.6839	0.6232	327.5	171.5	-
18	-18	1798	Nov 23	12:25:24	14	-2488	P	t-	0.6421	1.7128	0.6472	330.4	174.5	-
19	-17	1816	Dec 04	20:35:14	12	-2265	P	t-	0.6319	1.7338	0.6636	332.8	176.7	-
20	-16	1834	Dec 16	04:48:07	6	-2042	P	t-	0.6249	1.7487	0.6746	334.8	178.2	-
21	-15	1852	Dec 26	13:03:06	7	-1819	P	t-	0.6203	1.7588	0.6815	336.5	179.3	-
22	-14	1871	Jan 06	21:16:40	-0	-1596	P	t-	0.6154	1.7690	0.6893	338.0	180.5	-
23	-13	1889	Jan 17	05:29:39	-6	-1373	P	t-	0.6106	1.7788	0.6972	339.5	181.7	-
24	-12	1907	Jan 29	13:38:00	6	-1150	P	t-	0.6027	1.7936	0.7110	341.1	183.5	-
25	-11	1925	Feb 08	21:42:22	24	-927	P	t-	0.5921	1.8134	0.7304	342.9	185.7	-
26	-10	1943	Feb 20	05:38:23	26	-704	P	t-	0.5751	1.8444	0.7616	345.1	189.0	-
27	-09	1961	Mar 02	13:28:40	34	-481	P	t-	0.5540	1.8828	0.8006	347.6	192.9	-
28	-08	1979	Mar 13	21:08:52	50	-258	P	t-	0.5253	1.9350	0.8538	350.6	197.7	-
29	-07	1997	Mar 24	04:40:28	62	-35	P	t-	0.4899	1.9994	0.9195	353.9	203.1	-
30	-06	2015	Apr 04	12:01:24	69	188	T	t-	0.4460	2.0792	1.0008	357.5	209.0	4.7
31	-05	2033	Apr 14	19:13:51	80	411	T	t-	0.3954	2.1711	1.0944	361.2	215.0	49.2

32	-04	2051	Apr 26	02:16:28	96	634	T	p-	0.3371	2.2773	1.2022	364.8	220.8	69.6
33	-03	2069	May 06	09:09:57	133	857	T+	pp	0.2717	2.3965	1.3229	368.1	226.2	84.3
34	-02	2087	May 17	15:55:20	173	1080	T+	pp	0.1999	2.5276	1.4554	371.0	230.6	95.1
35	-01	2105	May 28	22:34:06	215	1303	T+	pp	0.1227	2.6687	1.5976	373.1	233.9	102.3
36	00	2123	Jun 09	05:06:28	259	1526	T+	pp	0.0406	2.8189	1.7487	374.3	235.7	106.1
37	01	2141	Jun 19	11:34:51	305	1749	T-	pp	-0.0446	2.8112	1.7415	374.4	235.9	106.1
38	02	2159	Jun 30	18:00:09	348	1972	T-	pp	-0.1322	2.6504	1.5809	373.4	234.1	102.0
39	03	2177	Jul 11	00:25:23	388	2195	T-	pp	-0.2199	2.4896	1.4199	371.2	230.4	93.0
40	04	2195	Jul 22	06:49:10	431	2418	T	pt	-0.3086	2.3271	1.2569	367.7	224.6	77.4
41	05	2213	Aug 02	13:16:20	475	2641	T	-t	-0.3946	2.1698	1.0987	363.1	216.8	50.6
42	06	2231	Aug 13	19:45:54	521	2864	P	-t	-0.4786	2.0163	0.9439	357.4	206.9	-
43	07	2249	Aug 24	02:22:14	570	3087	P	-t	-0.5572	1.8728	0.7990	350.9	195.3	-
44	08	2267	Sep 04	09:02:59	620	3310	P	-t	-0.6322	1.7360	0.6605	343.6	181.7	-
45	09	2285	Sep 14	15:53:25	673	3533	P	-t	-0.6997	1.6132	0.5357	336.1	166.9	-
46	10	2303	Sep 26	22:50:54	727	3756	P	-t	-0.7615	1.5007	0.4212	328.4	150.5	-
47	11	2321	Oct 07	05:58:35	784	3979	P	-t	-0.8152	1.4033	0.3218	320.9	133.4	-
48	12	2339	Oct 18	13:14:22	843	4202	P	-t	-0.8625	1.3175	0.2339	313.8	115.1	-
49	13	2357	Oct 28	20:41:13	904	4425	P	-t	-0.9009	1.2478	0.1625	307.4	96.8	-
50	14	2375	Nov 09	04:16:34	966	4648	P	-t	-0.9330	1.1898	0.1030	301.8	77.6	-
51	15	2393	Nov 19	12:00:29	1031	4871	P	-t	-0.9583	1.1439	0.0560	297.0	57.5	-
52	16	2411	Nov 30	19:52:22	1098	5094	P	-t	-0.9774	1.1091	0.0205	293.1	34.9	-
53	17	2429	Dec 11	03:51:44	1168	5317	Nx	-t	-0.9904	1.0853	-0.0033	290.1	-	-
54	18	2447	Dec 22	11:56:10	1239	5540	Nx	-t	-1.0001	1.0673	-0.0207	287.7	-	-
55	19	2466	Jan 01	20:04:17	1312	5763	Nx	-t	-1.0070	1.0540	-0.0328	285.6	-	-
56	20	2484	Jan 13	04:14:53	1387	5986	Nx	-t	-1.0124	1.0430	-0.0418	283.8	-	-
57	21	2502	Jan 24	12:26:40	1465	6209	Nx	-t	-1.0173	1.0327	-0.0494	281.9	-	-
58	22	2520	Feb 04	20:36:27	1544	6432	Nx	-t	-1.0242	1.0184	-0.0603	279.5	-	-
59	23	2538	Feb 15	04:44:31	1626	6655	Nx	-t	-1.0329	1.0003	-0.0744	276.6	-	-

60	24	2556	Feb 26	12:48:08	1709	6878	N	-t	-1.0459	0.9742	-0.0959	272.7	-	-
61	25	2574	Mar 08	20:47:08	1795	7101	N	-t	-1.0631	0.9400	-0.1249	267.8	-	-
62	26	2592	Mar 19	04:38:54	1883	7324	N	-t	-1.0867	0.8938	-0.1655	261.3	-	-
63	27	2610	Mar 31	12:25:16	1973	7547	N	-t	-1.1153	0.8384	-0.2149	253.5	-	-
64	28	2628	Apr 10	20:04:00	2065	7770	N	-t	-1.1504	0.7709	-0.2764	243.7	-	-
65	29	2646	Apr 22	03:35:31	2159	7993	N	-t	-1.1920	0.6915	-0.3496	231.6	-	-
66	30	2664	May 02	11:00:10	2255	8216	N	-t	-1.2396	0.6009	-0.4340	216.8	-	-
67	31	2682	May 13	18:18:50	2353	8439	N	-t	-1.2927	0.5004	-0.5284	198.9	-	-
68	32	2700	May 25	01:32:20	2453	8662	N	-t	-1.3504	0.3916	-0.6315	176.9	-	-
69	33	2718	Jun 05	08:40:08	2555	8885	N	-t	-1.4132	0.2737	-0.7438	148.9	-	-
70	34	2736	Jun 15	15:45:49	2660	9108	N	-t	-1.4783	0.1516	-0.8608	111.5	-	-
71	35	2754	Jun 26	22:48:44	2766	9331	Ne	-t	-1.5463	0.0245	-0.9832	45.1	-	-

SAROS SERIES

133

Saros series 133 contains 71 lunar eclipses.

PHASE

DURATIONS

SEQ. REL. CALENDAR TD ΔT LUNA ECL. QSE GAMMA PEN. UM. PEN. PAR. TOTAL

NUM.	NUM.	DATE	OF	s	NUM	TYPE	MAG.	MAG.	m	m	m
GREATEST											
ECLIPSE											
01	-34	1557 May 13 09:23:04	144	-5475	Nb t-	-1.5370 0.0734 -0.9975	83.9	-	-		
02	-33	1575 May 24 15:51:37	132	-5252	N t-	-1.4542 0.2241 -0.8444	144.3	-	-		
03	-32	1593 Jun 13 22:19:51	122	-5029	N t-	-1.3703 0.3770 -0.6895	184.3	-	-		
04	-31	1611 Jun 25 04:45:08	105	-4806	N t-	-1.2836 0.5352 -0.5295	216.0	-	-		
05	-30	1629 Jul 05 11:11:37	80	-4583	N t-	-1.1969 0.6937 -0.3696	241.7	-	-		
06	-29	1647 Jul 16 17:39:13	53	-4360	N t-	-1.1100 0.8527 -0.2097	263.3	-	-		
07	-28	1665 Jul 27 00:11:35	28	-4137	Nx t-	-1.0260 1.0063 -0.0554	281.0	-	-		
08	-27	1683 Aug 07 06:48:53	12	-3914	P t-	-0.9452 1.1546 0.0931	295.7	73.7	-		
09	-26	1701 Aug 18 13:32:17	8	-3691	P t-	-0.8683 1.2957 0.2342	307.8	114.3	-		
10	-25	1719 Aug 29 20:24:03	10	-3468	P t-	-0.7974 1.4259 0.3641	317.5	139.5	-		
11	-24	1737 Sep 09 03:24:12	11	-3245	P t-	-0.7325 1.5453 0.4830	325.3	157.4	-		
12	-23	1755 Sep 20 10:34:08	14	-3022	P t-	-0.6745 1.6521 0.5890	331.3	170.5	-		
13	-22	1773 Sep 30 17:53:06	16	-2799	P t-	-0.6232 1.7467 0.6829	336.0	180.3	-		
14	-21	1791 Oct 12 01:23:20	16	-2576	P t-	-0.5802 1.8259 0.7615	339.4	187.4	-		
15	-20	1809 Oct 23 09:02:46	12	-2353	P t-	-0.5440 1.8924 0.8275	341.8	192.6	-		
16	-19	1827 Nov 03 16:51:55	8	-2130	P h-	-0.5151 1.9457 0.8805	343.3	196.3	-		
17	-18	1845 Nov 14 00:49:42	6	-1907	P h-	-0.4924 1.9872 0.9221	344.1	198.9	-		
18	-17	1863 Nov 25 08:56:11	7	-1684	P a-	-0.4760 2.0170 0.9525	344.4	200.4	-		
19	-16	1881 Dec 05 17:08:33	-5	-1461	P a-	-0.4640 2.0386 0.9751	344.2	201.4	-		
20	-15	1899 Dec 17 01:25:45	-3	-1238	P a-	-0.4551 2.0541 0.9922	343.7	202.0	-		
21	-14	1917 Dec 28 09:46:32	20	-1015	T a-	-0.4484 2.0652 1.0056	343.0	202.3	12.0		
22	-13	1936 Jan 08 18:09:58	24	-792	T a-	-0.4428 2.0740 1.0173	342.1	202.5	20.8		
23	-12	1954 Jan 19 02:32:21	31	-569	T a-	-0.4357 2.0853 1.0322	341.2	202.9	28.2		
24	-11	1972 Jan 30 10:54:05	42	-346	T a-	-0.4273 2.0987 1.0497	340.3	203.4	34.8		
25	-10	1990 Feb 09 19:12:02	57	-123	T a-	-0.4148 2.1191 1.0750	339.6	204.3	42.3		

26	-09	2008 Feb 21	03:27:09	66	100	T a-	-0.3992	2.1451	1.1062	339.0	205.4	49.8
27	-08	2026 Mar 03	11:34:52	75	323	T a-	-0.3765	2.1838	1.1507	338.6	207.2	58.3
28	-07	2044 Mar 13	19:38:33	88	546	T a-	-0.3496	2.2303	1.2031	338.4	209.1	66.4
29	-06	2062 Mar 25	03:33:50	118	769	T p-	-0.3150	2.2905	1.2695	338.3	211.3	74.7
30	-05	2080 Apr 04	11:23:38	157	992	T p-	-0.2751	2.3607	1.3460	338.3	213.6	82.1
31	-04	2098 Apr 15	19:04:48	198	1215	T- p-	-0.2272	2.4454	1.4369	338.3	215.8	89.0
32	-03	2116 Apr 27	02:41:18	242	1438	T- p-	-0.1746	2.5388	1.5364	338.1	217.7	94.6
33	-02	2134 May 08	10:10:41	287	1661	T- pp	-0.1152	2.6447	1.6482	337.6	219.0	98.8
34	-01	2152 May 18	17:35:13	333	1884	T- pp	-0.0511	2.7597	1.7688	336.7	219.6	101.2
35	00	2170 May 30	00:55:17	372	2107	T+ pp	0.0174	2.8188	1.8330	335.3	219.3	101.7
36	01	2188 Jun 09	08:12:51	414	2330	T+ pp	0.0887	2.6856	1.7045	333.2	218.0	99.8
37	02	2206 Jun 21	15:28:26	457	2553	T+ pp	0.1626	2.5480	1.5711	330.5	215.5	95.4
38	03	2224 Jul 01	22:43:13	503	2776	T+ -p	0.2378	2.4081	1.4348	327.0	211.7	87.7
39	04	2242 Jul 13	05:59:11	550	2999	T -p	0.3129	2.2688	1.2985	322.9	206.7	76.2
40	05	2260 Jul 23	13:17:09	600	3222	T -p	0.3867	2.1322	1.1642	318.1	200.5	59.0
41	06	2278 Aug 03	20:37:40	652	3445	T -a	0.4592	1.9983	1.0322	312.7	193.0	27.1
42	07	2296 Aug 14	04:03:01	705	3668	P -a	0.5282	1.8710	0.9060	306.8	184.5	-
43	08	2314 Aug 26	11:33:39	761	3891	P -a	0.5935	1.7508	0.7866	300.7	175.1	-
44	09	2332 Sep 05	19:11:20	819	4114	P -a	0.6533	1.6412	0.6771	294.4	165.0	-
45	10	2350 Sep 17	02:54:54	879	4337	P -a	0.7087	1.5396	0.5752	288.1	154.3	-
46	11	2368 Sep 27	10:47:20	941	4560	P -a	0.7571	1.4511	0.4862	282.1	143.5	-
47	12	2386 Oct 08	18:46:46	1006	4783	P -a	0.8002	1.3725	0.4066	276.4	132.5	-
48	13	2404 Oct 19	02:55:17	1072	5006	P -a	0.8362	1.3070	0.3400	271.4	122.2	-
49	14	2422 Oct 30	11:10:45	1140	5229	P -a	0.8668	1.2513	0.2831	266.9	112.2	-
50	15	2440 Nov 09	19:35:18	1210	5452	P -a	0.8904	1.2086	0.2392	263.2	103.7	-
51	16	2458 Nov 21	04:06:22	1283	5675	P -a	0.9091	1.1749	0.2043	260.2	96.1	-
52	17	2476 Dec 01	12:44:17	1357	5898	P -a	0.9228	1.1503	0.1789	257.9	90.2	-
53	18	2494 Dec 12	21:27:43	1434	6121	P -a	0.9324	1.1330	0.1610	256.2	85.7	-

54	19	2512	Dec 24	06:15:46	1513	6344	P	-a	0.9388	1.1213	0.1490	255.0	82.5	-
55	20	2531	Jan 04	15:06:28	1593	6567	P	-a	0.9433	1.1130	0.1407	254.1	80.2	-
56	21	2549	Jan 14	23:58:01	1676	6790	P	-a	0.9477	1.1048	0.1330	253.2	78.0	-
57	22	2567	Jan 26	08:49:56	1761	7013	P	-a	0.9521	1.0963	0.1254	252.3	75.8	-
58	23	2585	Feb 05	17:40:16	1848	7236	P	-a	0.9585	1.0839	0.1143	251.0	72.4	-
59	24	2603	Feb 18	02:26:58	1937	7459	P	-a	0.9679	1.0657	0.0978	249.3	67.1	-
60	25	2621	Feb 28	11:09:03	2028	7682	P	-a	0.9813	1.0401	0.0741	246.8	58.6	-
61	26	2639	Mar 11	19:45:23	2121	7905	P	-a	0.9996	1.0054	0.0417	243.5	44.2	-
62	27	2657	Mar 22	04:15:37	2217	8128	N	-a	1.0230	0.9612	-0.0001	239.1	-	-
63	28	2675	Apr 02	12:37:33	2314	8351	N	-a	1.0534	0.9044	-0.0546	233.3	-	-
64	29	2693	Apr 12	20:52:52	2413	8574	N	-a	1.0893	0.8373	-0.1193	226.0	-	-
65	30	2711	Apr 25	04:59:49	2515	8797	N	-a	1.1317	0.7584	-0.1961	216.9	-	-
66	31	2729	May 05	12:59:44	2618	9020	N	-a	1.1800	0.6688	-0.2837	205.6	-	-
67	32	2747	May 16	20:51:32	2724	9243	N	-a	1.2348	0.5675	-0.3835	191.4	-	-
68	33	2765	May 27	04:37:27	2832	9466	N	-a	1.2942	0.4579	-0.4918	173.9	-	-
69	34	2783	Jun 07	12:17:27	2941	9689	N	-a	1.3582	0.3401	-0.6090	151.8	-	-
70	35	2801	Jun 17	19:51:48	3053	9912	N	-a	1.4265	0.2146	-0.7343	122.1	-	-
71	36	2819	Jun 29	03:22:47	3167	10135	Ne	-a	1.4969	0.0856	-0.8637	78.2	-	-

SAROS SERIES

134

Saros series 134 contains 72 lunar eclipses.

													PHASE
													DURATIONS
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-37	1550 Apr 01 12:54:38	150 -5563	Nb	a-	1.5506	0.0022	-0.9770	12.9	-	-		
02	-36	1568 Apr 11 20:39:00	136 -5340	N	a-	1.4970	0.0979	-0.8760	85.4	-	-		
03	-35	1586 May 03 04:16:35	125 -5117	N	a-	1.4373	0.2049	-0.7639	121.9	-	-		
04	-34	1604 May 13 11:49:46	114 -4894	N	a-	1.3732	0.3201	-0.6441	150.2	-	-		
05	-33	1622 May 24 19:18:16	90 -4671	N	a-	1.3046	0.4440	-0.5161	174.3	-	-		
06	-32	1640 Jun 04 02:45:05	63 -4448	N	a-	1.2340	0.5718	-0.3848	194.8	-	-		
07	-31	1658 Jun 15 10:08:00	37 -4225	N	a-	1.1593	0.7073	-0.2463	213.1	-	-		
08	-30	1676 Jun 25 17:32:06	17 -4002	N	a-	1.0849	0.8427	-0.1086	228.9	-	-		
09	-29	1694 Jul 07 00:55:25	8 -3779	P	a-	1.0089	0.9813	0.0317	242.8	39.0	-		
10	-28	1712 Jul 18 08:21:48	9 -3556	P	a-	0.9350	1.1162	0.1678	254.7	87.9	-		
11	-27	1730 Jul 29 15:49:46	11 -3333	P	a-	0.8619	1.2503	0.3022	265.1	115.5	-		
12	-26	1748 Aug 08 23:23:28	13 -3110	P	a-	0.7929	1.3769	0.4287	273.8	134.9	-		
13	-25	1766 Aug 20 07:01:43	15 -2887	P	a-	0.7272	1.4978	0.5489	281.3	149.6	-		
14	-24	1784 Aug 30 14:45:57	17 -2664	P	a-	0.6662	1.6104	0.6602	287.4	161.1	-		
15	-23	1802 Sep 11 22:36:46	13 -2441	P	a-	0.6105	1.7134	0.7615	292.6	170.0	-		
16	-22	1820 Sep 22 06:35:09	11 -2218	P	a-	0.5612	1.8049	0.8511	296.7	176.8	-		
17	-21	1838 Oct 03 14:41:28	5 -1995	P	a-	0.5182	1.8849	0.9288	300.0	182.1	-		
18	-20	1856 Oct 13 22:54:33	7 -1772	P	a-	0.4809	1.9545	0.9960	302.7	186.2	-		
19	-19	1874 Oct 25 07:16:22	-3 -1549	T	a-	0.4510	2.0108	1.0497	304.8	189.2	32.7		
20	-18	1892 Nov 04 15:44:53	-6 -1326	T	p-	0.4267	2.0565	1.0930	306.5	191.5	44.1		

21	-17	1910 Nov 17 00:20:52	12	-1103	T	p-	0.4089	2.0905	1.1246	307.7	193.0	50.6
22	-16	1928 Nov 27 09:01:47	24	-880	T	p-	0.3952	2.1166	1.1486	308.7	194.2	54.8
23	-15	1946 Dec 08 17:48:28	28	-657	T	p-	0.3864	2.1337	1.1639	309.5	194.9	57.3
24	-14	1964 Dec 19 02:37:54	36	-434	T	p-	0.3801	2.1461	1.1748	310.1	195.5	58.9
25	-13	1982 Dec 30 11:29:37	53	-211	T	p-	0.3758	2.1545	1.1822	310.6	195.9	60.0
26	-12	2001 Jan 09 20:21:40	64	12	T	p-	0.3720	2.1618	1.1889	311.0	196.3	61.0
27	-11	2019 Jan 21 05:13:27	71	235	T	p-	0.3684	2.1684	1.1953	311.5	196.8	62.0
28	-10	2037 Jan 31 14:01:38	82	458	T	p-	0.3619	2.1803	1.2074	312.1	197.5	63.7
29	-09	2055 Feb 11 22:46:17	103	681	T	p-	0.3526	2.1970	1.2246	312.9	198.4	66.0
30	-08	2073 Feb 22 07:24:53	142	904	T	p-	0.3388	2.2218	1.2503	313.8	199.7	69.2
31	-07	2091 Mar 05 15:58:22	182	1127	T	p-	0.3212	2.2537	1.2832	315.0	201.3	72.9
32	-06	2109 Mar 17 00:22:28	224	1350	T	p-	0.2962	2.2989	1.3296	316.4	203.3	77.5
33	-05	2127 Mar 28 08:40:17	269	1573	T+	p-	0.2664	2.3531	1.3849	318.0	205.5	82.3
34	-04	2145 Apr 07 16:48:09	315	1796	T+	p-	0.2285	2.4221	1.4550	319.7	207.9	87.3
35	-03	2163 Apr 19 00:49:33	357	2019	T+	p-	0.1858	2.5000	1.5338	321.5	210.2	91.8
36	-02	2181 Apr 29 08:40:08	397	2242	T+	pp	0.1345	2.5938	1.6281	323.2	212.3	95.9
37	-01	2199 May 10 16:25:22	440	2465	T+	pp	0.0793	2.6951	1.7297	324.8	214.0	98.8
38	00	2217 May 22 00:01:35	484	2688	T+	pp	0.0167	2.8100	1.8444	326.0	215.2	100.4
39	01	2235 Jun 02 07:32:48	531	2911	T-	pp	-0.0495	2.7501	1.7838	326.7	215.5	100.1
40	02	2253 Jun 12 14:57:11	580	3134	T-	p	-0.1210	2.6195	1.6520	326.9	214.8	97.6
41	03	2271 Jun 23 22:18:46	631	3357	T-	p	-0.1943	2.4858	1.5166	326.4	212.9	92.3
42	04	2289 Jul 04 05:36:25	684	3580	T-	p	-0.2703	2.3477	1.3760	325.1	209.6	83.3
43	05	2307 Jul 16 12:51:48	739	3803	T	-a	-0.3475	2.2075	1.2329	323.0	204.9	69.1
44	06	2325 Jul 26 20:06:28	796	4026	T	-a	-0.4246	2.0679	1.0898	320.2	198.6	45.0
45	07	2343 Aug 07 03:21:51	855	4249	P	-a	-0.5005	1.9307	0.9484	316.5	190.7	-
46	08	2361 Aug 17 10:38:41	917	4472	P	-a	-0.5740	1.7981	0.8112	312.1	181.2	-
47	09	2379 Aug 28 17:58:09	980	4695	P	-a	-0.6445	1.6712	0.6792	307.1	170.1	-
48	10	2397 Sep 08 01:22:03	1045	4918	P	-a	-0.7104	1.5531	0.5556	301.7	157.4	-

49	11	2415 Sep 19 08:51:06	1113	5141	P	-a	-0.7713	1.4444	0.4410	296.1	143.2	-
50	12	2433 Sep 29 16:24:45	1182	5364	P	-a	-0.8273	1.3446	0.3352	290.4	127.2	-
51	13	2451 Oct 11 00:05:24	1254	5587	P	-a	-0.8768	1.2570	0.2413	284.9	109.8	-
52	14	2469 Oct 21 07:52:38	1328	5810	P	-a	-0.9196	1.1815	0.1596	279.8	90.6	-
53	15	2487 Nov 01 15:47:25	1404	6033	P	-a	-0.9559	1.1180	0.0900	275.3	68.9	-
54	16	2505 Nov 12 23:47:37	1481	6256	P	-a	-0.9869	1.0642	0.0301	271.4	40.3	-
55	17	2523 Nov 24 07:55:24	1561	6479	Nx	-a	-1.0110	1.0229	-0.0168	268.4	-	-
56	18	2541 Dec 04 16:08:21	1643	6702	N	-a	-1.0300	0.9907	-0.0543	266.2	-	-
57	19	2559 Dec 16 00:26:02	1727	6925	N	-a	-1.0444	0.9666	-0.0832	264.6	-	-
58	20	2577 Dec 26 08:46:27	1814	7148	N	-a	-1.0560	0.9475	-0.1065	263.5	-	-
59	21	2596 Jan 06 17:09:04	1902	7371	N	-a	-1.0652	0.9325	-0.1251	262.8	-	-
60	22	2614 Jan 18 01:31:45	1992	7594	N	-a	-1.0735	0.9188	-0.1418	262.1	-	-
61	23	2632 Jan 29 09:52:07	2084	7817	N	-a	-1.0828	0.9028	-0.1600	261.1	-	-
62	24	2650 Feb 08 18:09:59	2179	8040	N	-a	-1.0934	0.8843	-0.1803	259.7	-	-
63	25	2668 Feb 20 02:22:36	2275	8263	N	-h	-1.1072	0.8593	-0.2063	257.4	-	-
64	26	2686 Mar 02 10:28:53	2374	8486	N	-h	-1.1257	0.8258	-0.2405	253.9	-	-
65	27	2704 Mar 13 18:26:58	2475	8709	N	-h	-1.1501	0.7811	-0.2852	248.7	-	-
66	28	2722 Mar 25 02:17:14	2577	8932	N	-t	-1.1798	0.7264	-0.3398	241.7	-	-
67	29	2740 Apr 04 09:58:17	2682	9155	N	-t	-1.2163	0.6593	-0.4063	232.3	-	-
68	30	2758 Apr 15 17:28:58	2789	9378	N	-t	-1.2602	0.5783	-0.4867	219.8	-	-
69	31	2776 Apr 26 00:50:25	2898	9601	N	-t	-1.3110	0.4849	-0.5794	203.5	-	-
70	32	2794 May 07 08:02:01	3009	9824	N	-t	-1.3690	0.3781	-0.6856	181.9	-	-
71	33	2812 May 17 15:05:07	3122	10047	N	-t	-1.4327	0.2607	-0.8023	153.0	-	-
72	34	2830 May 28 21:58:39	3237	10270	N	-t	-1.5032	0.1312	-0.9315	110.1	-	-

SAROS SERIES

135

Saros series 135 contains 71 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-36	1615 Apr 13	19:38:31	100	-4759	Nb a-	-1.5327	0.0399	-0.9488	55.6	-	-		
02	-35	1633 Apr 24	03:17:46	74	-4536	N a-	-1.4852	0.1271	-0.8619	98.9	-	-		
03	-34	1651 May 05	10:48:41	47	-4313	N a-	-1.4321	0.2249	-0.7647	130.8	-	-		
04	-33	1669 May 15	18:11:57	24	-4090	N h-	-1.3734	0.3332	-0.6575	158.2	-	-		
05	-32	1687 May 27	01:28:13	10	-3867	N h-	-1.3095	0.4512	-0.5410	182.7	-	-		
06	-31	1705 Jun 07	08:39:03	9	-3644	N h-	-1.2419	0.5763	-0.4180	204.8	-	-		
07	-30	1723 Jun 18	15:45:35	10	-3421	N t-	-1.1715	0.7068	-0.2902	224.8	-	-		
08	-29	1741 Jun 28	22:47:45	12	-3198	N t-	-1.0981	0.8430	-0.1571	243.1	-	-		
09	-28	1759 Jul 10	05:48:57	14	-2975	N t-	-1.0246	0.9797	-0.0240	259.5	-	-		
10	-27	1777 Jul 20	12:48:46	17	-2752	P t-	-0.9508	1.1173	0.1093	274.3	75.8	-		
11	-26	1795 Jul 31	19:50:34	15	-2529	P t-	-0.8791	1.2513	0.2387	287.3	110.4	-		
12	-25	1813 Aug 12	02:52:49	12	-2306	P t-	-0.8085	1.3834	0.3655	299.0	134.5	-		
13	-24	1831 Aug 23	09:59:56	7	-2083	P t-	-0.7428	1.5067	0.4833	309.1	152.4	-		

14	-23	1849 Sep 02 17:10:17	7	-1860	P t-	-0.6806	1.6238	0.5945	317.9	166.6	-
15	-22	1867 Sep 14 00:26:27	3	-1637	P t-	-0.6239	1.7309	0.6956	325.5	177.8	-
16	-21	1885 Sep 24 07:48:12	-6	-1414	P t-	-0.5725	1.8284	0.7867	332.0	186.7	-
17	-20	1903 Oct 06 15:17:33	2	-1191	P t-	-0.5280	1.9133	0.8654	337.5	193.7	-
18	-19	1921 Oct 16 22:53:59	22	-968	P t-	-0.4902	1.9858	0.9317	342.1	199.1	-
19	-18	1939 Oct 28 06:36:43	24	-745	P t-	-0.4581	2.0477	0.9877	346.1	203.4	-
20	-17	1957 Nov 07 14:27:30	32	-522	T t-	-0.4332	2.0963	1.0305	349.3	206.5	27.9
21	-16	1975 Nov 18 22:24:12	46	-299	T p-	-0.4134	2.1352	1.0642	352.1	209.0	40.2
22	-15	1993 Nov 29 06:27:06	60	-76	T p-	-0.3994	2.1633	1.0876	354.4	210.8	46.7
23	-14	2011 Dec 10 14:32:56	68	147	T p-	-0.3882	2.1860	1.1061	356.4	212.2	51.1
24	-13	2029 Dec 20 22:43:12	78	370	T p-	-0.3811	2.2008	1.1174	358.0	213.3	53.7
25	-12	2048 Jan 01 06:53:55	91	593	T p-	-0.3745	2.2141	1.1280	359.4	214.3	55.9
26	-11	2066 Jan 11 15:04:47	126	816	T p-	-0.3687	2.2259	1.1378	360.7	215.2	57.9
27	-10	2084 Jan 22 23:13:00	166	1039	T p-	-0.3610	2.2407	1.1513	362.0	216.3	60.5
28	-09	2102 Feb 03 07:18:21	207	1262	T p-	-0.3514	2.2585	1.1686	363.2	217.5	63.6
29	-08	2120 Feb 14 15:17:20	251	1485	T p-	-0.3371	2.2848	1.1950	364.6	219.1	67.9
30	-07	2138 Feb 24 23:09:56	297	1708	T p-	-0.3178	2.3198	1.2306	366.1	221.1	73.1
31	-06	2156 Mar 07 06:54:14	341	1931	T p-	-0.2922	2.3663	1.2782	367.7	223.5	79.0
32	-05	2174 Mar 18 14:30:50	381	2154	T- pp	-0.2605	2.4236	1.3371	369.4	226.0	85.2
33	-04	2192 Mar 28 21:56:24	423	2377	T- pp	-0.2202	2.4966	1.4120	371.1	228.8	91.6
34	-03	2210 Apr 10 05:13:49	467	2600	T- pp	-0.1736	2.5812	1.4985	372.7	231.3	97.3
35	-02	2228 Apr 20 12:20:32	513	2823	T- pp	-0.1184	2.6812	1.6007	374.0	233.6	102.1
36	-01	2246 May 01 19:20:11	561	3046	T- pp	-0.0575	2.7920	1.7136	374.9	235.2	105.2
37	00	2264 May 12 02:08:52	611	3269	T+ pp	0.0121	2.8742	1.7979	375.2	235.8	106.2
38	01	2282 May 23 08:52:42	663	3492	T+ pp	0.0856	2.7385	1.6640	374.6	235.1	104.4
39	02	2300 Jun 03 15:28:06	717	3715	T+ pp	0.1655	2.5911	1.5183	373.1	232.8	99.0
40	03	2318 Jun 14 22:00:42	773	3938	T+ pp	0.2477	2.4395	1.3681	370.4	228.8	88.9
41	04	2336 Jun 25 04:27:14	832	4161	T -t	0.3347	2.2794	1.2090	366.4	222.5	71.0

42	05	2354	Jul 06	10:53:56	892	4384	T	-t	0.4214	2.1198	1.0501	361.2	214.0	36.7		
43	06	2372	Jul 16	17:18:29	955	4607	P	-t	0.5095	1.9581	0.8887	354.5	202.8	-		
44	07	2390	Jul 27	23:44:46	1019	4830	P	-t	0.5961	1.7992	0.7298	346.7	188.9	-		
45	08	2408	Aug 07	06:12:58	1086	5053	P	-t	0.6809	1.6438	0.5740	337.6	171.8	-		
46	09	2426	Aug 18	12:46:04	1155	5276	P	-t	0.7614	1.4963	0.4258	327.5	151.4	-		
47	10	2444	Aug 28	19:24:50	1226	5499	P	-t	0.8375	1.3572	0.2857	316.7	126.5	-		
48	11	2462	Sep 09	02:10:01	1298	5722	P	-t	0.9084	1.2278	0.1551	305.3	94.9	-		
49	12	2480	Sep 19	09:03:33	1373	5945	P	-t	0.9726	1.1107	0.0366	293.8	46.8	-		
50	13	2498	Sep 30	16:05:36	1450	6168	Nx	-t	1.0300	1.0062	-0.0694	282.4	-	-		
51	14	2516	Oct 11	23:17:01	1530	6391	N	-t	1.0802	0.9148	-0.1624	271.5	-	-		
52	15	2534	Oct 23	06:38:03	1611	6614	N	-t	1.1230	0.8370	-0.2416	261.5	-	-		
53	16	2552	Nov 02	14:09:22	1694	6837	N	-t	1.1581	0.7731	-0.3067	252.5	-	-		
54	17	2570	Nov 13	21:50:12	1779	7060	N	-t	1.1859	0.7227	-0.3581	245.0	-	-		
55	18	2588	Nov 24	05:39:09	1867	7283	N	-t	1.2078	0.6828	-0.3986	238.6	-	-		
56	19	2606	Dec 06	13:36:27	1956	7506	N	-t	1.2234	0.6542	-0.4274	233.7	-	-		
57	20	2624	Dec 16	21:40:25	2048	7729	N	-t	1.2345	0.6336	-0.4476	230.0	-	-		
58	21	2642	Dec 28	05:49:29	2141	7952	N	-t	1.2419	0.6196	-0.4605	227.2	-	-		
59	22	2661	Jan 07	14:01:35	2237	8175	N	-t	1.2474	0.6087	-0.4697	224.8	-	-		
60	23	2679	Jan 18	22:16:02	2335	8398	N	-t	1.2515	0.5998	-0.4762	222.7	-	-		
61	24	2697	Jan 29	06:31:11	2435	8621	N	-t	1.2559	0.5902	-0.4828	220.4	-	-		
62	25	2715	Feb 10	14:44:02	2536	8844	N	-t	1.2626	0.5760	-0.4931	217.3	-	-		
63	26	2733	Feb 20	22:54:49	2640	9067	N	-t	1.2716	0.5573	-0.5075	213.3	-	-		
64	27	2751	Mar 04	07:00:48	2746	9290	N	-t	1.2850	0.5303	-0.5295	207.8	-	-		
65	28	2769	Mar 14	15:02:24	2855	9513	N	-t	1.3025	0.4953	-0.5591	200.7	-	-		
66	29	2787	Mar 25	22:56:42	2965	9736	N	-t	1.3267	0.4481	-0.6005	191.0	-	-		
67	30	2805	Apr 05	06:45:50	3077	9959	N	-t	1.3557	0.3919	-0.6507	178.8	-	-		
68	31	2823	Apr 16	14:27:27	3191	10182	N	-t	1.3911	0.3237	-0.7127	162.8	-	-		
69	32	2841	Apr 26	22:02:28	3308	10405	N	-t	1.4326	0.2445	-0.7856	141.9	-	-		

70	33	2859	May 08	05:30:26	3426	10628	N	-t	1.4800	0.1543	-0.8695	113.1	-	-
71	34	2877	May 18	12:53:08	3547	10851	Ne	-t	1.5321	0.0556	-0.9623	68.2	-	-

SAROS SERIES

136

Saros series 136 contains 72 lunar eclipses.

													PHASE
													DURATIONS
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-34	1680 Apr 13	23:18:00	14	-3955	Nb t-	1.5494	0.0560	-1.0254	73.6	-	-	
02	-33	1698 Apr 25	06:11:31	8	-3732	N t-	1.4876	0.1675	-0.9101	125.8	-	-	
03	-32	1716 May 06	12:57:42	10	-3509	N t-	1.4192	0.2912	-0.7828	163.7	-	-	
04	-31	1734 May 17	19:38:11	11	-3286	N t-	1.3452	0.4252	-0.6453	195.0	-	-	
05	-30	1752 May 28	02:13:58	13	-3063	N t-	1.2666	0.5677	-0.4996	221.9	-	-	
06	-29	1770 Jun 08	08:45:13	16	-2840	N t-	1.1836	0.7186	-0.3457	245.4	-	-	
07	-28	1788 Jun 18	15:15:25	16	-2617	N t-	1.0985	0.8734	-0.1883	265.8	-	-	

08	-27	1806 Jun 30 21:44:38	12	-2394	Nx t-	1.0115	1.0320	-0.0276	283.6	-	-
09	-26	1824 Jul 11 04:14:59	10	-2171	P t-	0.9245	1.1908	0.1330	298.7	87.6	-
10	-25	1842 Jul 22 10:47:38	6	-1948	P t-	0.8383	1.3480	0.2917	311.6	126.5	-
11	-24	1860 Aug 01 17:25:03	8	-1725	P t-	0.7551	1.5003	0.4450	322.2	152.3	-
12	-23	1878 Aug 13 00:08:23	-5	-1502	P t-	0.6756	1.6458	0.5912	330.8	171.1	-
13	-22	1896 Aug 23 06:57:19	-6	-1279	P t-	0.5997	1.7849	0.7306	337.8	185.4	-
14	-21	1914 Sep 04 13:54:57	17	-1056	P t-	0.5301	1.9127	0.8585	343.2	196.0	-
15	-20	1932 Sep 14 21:01:00	24	-833	P t-	0.4664	2.0296	0.9752	347.2	204.0	-
16	-19	1950 Sep 26 04:17:11	29	-610	T t-	0.4101	2.1331	1.0783	350.1	209.8	44.3
17	-18	1968 Oct 06 11:42:35	39	-387	T t-	0.3605	2.2242	1.1691	352.0	213.9	63.0
18	-17	1986 Oct 17 19:18:54	55	-164	T h-	0.3188	2.3008	1.2455	353.2	216.8	73.7
19	-16	2004 Oct 28 03:05:11	65	59	T p-	0.2846	2.3637	1.3081	353.8	218.7	80.5
20	-15	2022 Nov 08 11:00:22	73	282	T+ p-	0.2570	2.4143	1.3589	353.9	219.8	85.0
21	-14	2040 Nov 18 19:04:40	85	505	T+ p-	0.2361	2.4525	1.3974	353.6	220.4	87.8
22	-13	2058 Nov 30 03:16:18	111	728	T+ p-	0.2208	2.4802	1.4260	353.0	220.7	89.7
23	-12	2076 Dec 10 11:34:51	150	951	T+ p-	0.2102	2.4990	1.4460	352.2	220.6	90.8
24	-11	2094 Dec 21 19:56:32	191	1174	T+ p-	0.2016	2.5138	1.4627	351.2	220.5	91.6
25	-10	2113 Jan 02 04:22:59	234	1397	T+ p-	0.1964	2.5221	1.4735	350.1	220.2	92.1
26	-09	2131 Jan 13 12:49:59	279	1620	T+ p-	0.1914	2.5296	1.4842	348.9	219.8	92.5
27	-08	2149 Jan 23 21:17:23	325	1843	T+ p-	0.1859	2.5379	1.4962	347.6	219.6	93.0
28	-07	2167 Feb 04 05:41:32	365	2066	T+ p-	0.1772	2.5517	1.5143	346.4	219.4	93.8
29	-06	2185 Feb 14 14:03:41	406	2289	T+ p-	0.1660	2.5697	1.5372	345.1	219.4	94.8
30	-05	2203 Feb 26 22:20:39	449	2512	T+ p-	0.1500	2.5964	1.5692	343.9	219.5	96.1
31	-04	2221 Mar 09 06:32:19	494	2735	T+ p-	0.1290	2.6321	1.6106	342.7	219.6	97.5
32	-03	2239 Mar 20 14:37:27	541	2958	T+ p-	0.1017	2.6791	1.6635	341.5	219.8	99.1
33	-02	2257 Mar 30 22:36:42	591	3181	T+ pp	0.0687	2.7368	1.7272	340.2	220.0	100.4
34	-01	2275 Apr 11 06:28:07	642	3404	T+ pp	0.0283	2.8077	1.8043	338.8	219.9	101.3
35	00	2293 Apr 21 14:13:28	695	3627	T- pp	-0.0179	2.8237	1.8264	337.2	219.5	101.4

36	01	2311	May 03	21:52:07	751	3850	T-	pp	-0.0706	2.7241	1.7326	335.3	218.5	100.3
37	02	2329	May 14	05:26:11	808	4073	T-	pp	-0.1279	2.6162	1.6303	332.9	216.8	97.6
38	03	2347	May 25	12:53:35	868	4296	T-	pp	-0.1916	2.4966	1.5159	330.0	214.2	92.6
39	04	2365	Jun 04	20:18:36	930	4519	T-	-p	-0.2581	2.3722	1.3963	326.5	210.5	84.9
40	05	2383	Jun 16	03:39:21	994	4742	T	-p	-0.3291	2.2398	1.2682	322.2	205.5	73.0
41	06	2401	Jun 26	10:59:50	1059	4965	T	-p	-0.4007	2.1066	1.1387	317.2	199.2	54.6
42	07	2419	Jul 07	18:17:23	1127	5188	T	-a	-0.4754	1.9679	1.0032	311.4	191.3	8.6
43	08	2437	Jul 18	01:38:01	1197	5411	P	-a	-0.5482	1.8329	0.8708	305.0	182.0	-
44	09	2455	Jul 29	08:58:50	1269	5634	P	-a	-0.6217	1.6971	0.7368	297.7	170.9	-
45	10	2473	Aug 08	16:24:06	1344	5857	P	-a	-0.6919	1.5675	0.6087	289.9	158.2	-
46	11	2491	Aug 19	23:52:20	1420	6080	P	-a	-0.7602	1.4419	0.4837	281.6	143.5	-
47	12	2509	Aug 31	07:27:37	1498	6303	P	-a	-0.8231	1.3263	0.3684	273.2	127.1	-
48	13	2527	Sep 11	15:08:19	1578	6526	P	-a	-0.8822	1.2181	0.2599	264.5	108.3	-
49	14	2545	Sep 21	22:55:50	1661	6749	P	-a	-0.9362	1.1193	0.1604	255.9	86.1	-
50	15	2563	Oct 03	06:51:07	1745	6972	P	-a	-0.9842	1.0318	0.0718	247.7	58.2	-
51	16	2581	Oct 13	14:54:30	1832	7195	N	-a	-1.0259	0.9559	-0.0054	240.1	-	-
52	17	2599	Oct 24	23:06:08	1921	7418	N	-a	-1.0614	0.8917	-0.0711	233.2	-	-
53	18	2617	Nov 05	07:25:07	2011	7641	N	-a	-1.0911	0.8379	-0.1265	227.2	-	-
54	19	2635	Nov 16	15:52:29	2104	7864	N	-a	-1.1144	0.7960	-0.1700	222.2	-	-
55	20	2653	Nov 27	00:26:25	2199	8087	N	-a	-1.1326	0.7633	-0.2042	218.2	-	-
56	21	2671	Dec 08	09:06:19	2296	8310	N	-a	-1.1461	0.7392	-0.2295	215.1	-	-
57	22	2689	Dec 18	17:51:16	2395	8533	N	-a	-1.1558	0.7218	-0.2479	212.9	-	-
58	23	2707	Dec 31	02:40:18	2496	8756	N	-a	-1.1623	0.7102	-0.2601	211.4	-	-
59	24	2726	Jan 10	11:31:30	2599	8979	N	-a	-1.1674	0.7010	-0.2695	210.1	-	-
60	25	2744	Jan 21	20:23:11	2704	9202	N	-a	-1.1723	0.6919	-0.2785	208.9	-	-
61	26	2762	Feb 01	05:14:43	2812	9425	N	-a	-1.1775	0.6821	-0.2877	207.6	-	-
62	27	2780	Feb 12	14:04:32	2921	9648	N	-a	-1.1840	0.6697	-0.2993	205.9	-	-
63	28	2798	Feb 22	22:50:07	3032	9871	N	-a	-1.1945	0.6498	-0.3178	203.2	-	-

												PHASE	
												DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													

01	-43	1564	Dec 17	21:16:37	139	-5381	N	a-	-1.5587	0.0066	-1.0109	23.0	-	-
02	-42	1583	Jan 08	05:55:04	127	-5158	N	a-	-1.5513	0.0186	-0.9958	38.4	-	-
03	-41	1601	Jan 18	14:32:25	117	-4935	N	a-	-1.5425	0.0329	-0.9777	50.9	-	-
04	-40	1619	Jan 29	23:07:09	95	-4712	N	a-	-1.5311	0.0518	-0.9547	63.5	-	-
05	-39	1637	Feb 09	07:38:45	68	-4489	N	a-	-1.5164	0.0763	-0.9256	76.7	-	-
06	-38	1655	Feb 20	16:03:56	42	-4266	N	a-	-1.4962	0.1109	-0.8860	91.8	-	-
07	-37	1673	Mar 03	00:24:02	20	-4043	N	a-	-1.4715	0.1536	-0.8381	107.2	-	-
08	-36	1691	Mar 14	08:36:44	9	-3820	N	a-	-1.4403	0.2083	-0.7780	123.8	-	-
09	-35	1709	Mar 25	16:43:34	9	-3597	N	a-	-1.4038	0.2725	-0.7084	140.3	-	-
10	-34	1727	Apr 06	00:41:54	10	-3374	N	a-	-1.3596	0.3508	-0.6247	157.4	-	-
11	-33	1745	Apr 16	08:34:55	12	-3151	N	a-	-1.3106	0.4382	-0.5321	173.9	-	-
12	-32	1763	Apr 27	16:20:38	15	-2928	N	a-	-1.2552	0.5374	-0.4281	190.1	-	-
13	-31	1781	May 08	00:01:08	17	-2705	N	a-	-1.1949	0.6457	-0.3152	205.6	-	-
14	-30	1799	May 19	07:36:00	14	-2482	N	a-	-1.1294	0.7639	-0.1930	220.3	-	-
15	-29	1817	May 30	15:07:30	12	-2259	N	a-	-1.0607	0.8880	-0.0652	233.9	-	-
16	-28	1835	Jun 10	22:35:53	6	-2036	P	a-	-0.9888	1.0184	0.0681	246.4	56.8	-
17	-27	1853	Jun 21	06:01:48	7	-1813	P	a-	-0.9146	1.1535	0.2056	257.8	96.7	-
18	-26	1871	Jul 02	13:27:48	-1	-1590	P	a-	-0.8401	1.2893	0.3432	267.9	122.4	-
19	-25	1889	Jul 12	20:53:52	-6	-1367	P	a-	-0.7654	1.4257	0.4807	276.8	141.7	-
20	-24	1907	Jul 25	04:22:27	7	-1144	P	a-	-0.6924	1.5595	0.6149	284.5	156.8	-
21	-23	1925	Aug 04	11:52:57	24	-921	P	a-	-0.6208	1.6909	0.7463	291.2	168.9	-
22	-22	1943	Aug 15	19:28:46	26	-698	P	a-	-0.5533	1.8152	0.8697	296.7	178.4	-
23	-21	1961	Aug 26	03:08:51	34	-475	P	a-	-0.4894	1.9330	0.9863	301.4	186.0	-
24	-20	1979	Sep 06	10:55:02	50	-252	T	a-	-0.4305	2.0421	1.0936	305.1	191.9	44.4
25	-19	1997	Sep 16	18:47:42	63	-29	T	p-	-0.3768	2.1417	1.1909	308.2	196.4	61.5
26	-18	2015	Sep 28	02:48:17	69	194	T	p-	-0.3296	2.2296	1.2764	310.7	199.9	71.9
27	-17	2033	Oct 08	10:56:23	80	417	T	p-	-0.2889	2.3057	1.3497	312.6	202.4	78.8
28	-16	2051	Oct 19	19:11:50	97	640	T-	p-	-0.2542	2.3708	1.4118	314.2	204.3	83.6

29	-15	2069	Oct 30	03:35:06	134	863	T-	p-	-0.2263	2.4235	1.4616	315.4	205.6	86.8
30	-14	2087	Nov 10	12:05:33	174	1086	T-	p-	-0.2043	2.4654	1.5006	316.4	206.6	88.9
31	-13	2105	Nov 21	20:42:00	216	1309	T-	p-	-0.1874	2.4976	1.5301	317.3	207.3	90.4
32	-12	2123	Dec 03	05:24:09	261	1532	T-	p-	-0.1755	2.5208	1.5507	318.0	207.7	91.4
33	-11	2141	Dec 13	14:10:16	307	1755	T-	p-	-0.1671	2.5374	1.5652	318.7	208.1	92.0
34	-10	2159	Dec 24	23:00:09	349	1978	T-	p-	-0.1619	2.5478	1.5737	319.2	208.4	92.4
35	-09	2178	Jan 04	07:50:14	390	2201	T-	p-	-0.1570	2.5574	1.5820	319.8	208.8	92.8
36	-08	2196	Jan 15	16:41:55	432	2424	T-	p-	-0.1537	2.5641	1.5877	320.3	209.1	93.1
37	-07	2214	Jan 27	01:30:46	476	2647	T-	p-	-0.1480	2.5748	1.5979	320.9	209.5	93.6
38	-06	2232	Feb 07	10:17:44	522	2870	T-	p-	-0.1410	2.5876	1.6106	321.5	210.0	94.1
39	-05	2250	Feb 17	18:58:32	571	3093	T-	p-	-0.1291	2.6094	1.6326	322.2	210.7	95.0
40	-04	2268	Feb 29	03:35:27	621	3316	T-	p-	-0.1142	2.6365	1.6602	322.9	211.4	96.0
41	-03	2286	Mar 11	12:04:37	674	3539	T-	pp	-0.0929	2.6753	1.6996	323.7	212.3	97.2
42	-02	2304	Mar 22	20:26:42	729	3762	T-	pp	-0.0661	2.7240	1.7491	324.6	213.1	98.4
43	-01	2322	Apr 03	04:39:45	785	3985	T-	pp	-0.0323	2.7857	1.8116	325.4	213.9	99.4
44	00	2340	Apr 13	12:45:17	844	4208	T+	pp	0.0074	2.8310	1.8576	326.1	214.5	99.9
45	01	2358	Apr 24	20:41:46	905	4431	T+	pp	0.0542	2.7449	1.7720	326.7	214.8	99.5
46	02	2376	May 05	04:29:55	968	4654	T+	-p	0.1074	2.6471	1.6744	326.9	214.4	97.8
47	03	2394	May 16	12:10:00	1033	4877	T+	-p	0.1667	2.5384	1.5656	326.6	213.3	94.3
48	04	2412	May 26	19:43:25	1100	5100	T+	-p	0.2306	2.4214	1.4479	325.8	211.1	88.2
49	05	2430	Jun 07	03:09:30	1169	5323	T	-p	0.3000	2.2946	1.3201	324.3	207.7	78.4
50	06	2448	Jun 17	10:30:31	1241	5546	T	-a	0.3730	2.1615	1.1854	322.0	202.8	62.6
51	07	2466	Jun 28	17:46:38	1314	5769	T	-a	0.4490	2.0231	1.0448	318.7	196.2	32.2
52	08	2484	Jul 09	01:00:42	1389	5992	P	-a	0.5260	1.8831	0.9021	314.5	187.6	-
53	09	2502	Jul 21	08:11:07	1467	6215	P	-a	0.6051	1.7398	0.7554	309.2	176.6	-
54	10	2520	Jul 31	15:22:37	1546	6438	P	-a	0.6822	1.6002	0.6120	303.0	163.3	-
55	11	2538	Aug 11	22:33:32	1628	6661	P	-a	0.7588	1.4620	0.4693	295.7	146.7	-
56	12	2556	Aug 22	05:48:05	1712	6884	P	-a	0.8315	1.3309	0.3334	287.8	126.6	-

57	13	2574	Sep 02	13:03:42	1798	7107	P	-a	0.9023	1.2037	0.2008	278.9	100.5	-
58	14	2592	Sep 12	20:25:19	1885	7330	P	-a	0.9671	1.0876	0.0791	269.7	64.3	-
59	15	2610	Sep 25	03:50:47	1975	7553	N	-a	1.0277	0.9796	-0.0350	260.2	-	-
60	16	2628	Oct 05	11:22:30	2067	7776	N	-a	1.0821	0.8828	-0.1379	250.7	-	-
61	17	2646	Oct 16	19:00:12	2161	7999	N	-a	1.1308	0.7967	-0.2304	241.4	-	-
62	18	2664	Oct 27	02:45:20	2257	8222	N	-a	1.1726	0.7231	-0.3102	232.7	-	-
63	19	2682	Nov 07	10:37:27	2356	8445	N	-a	1.2077	0.6619	-0.3776	225.0	-	-
64	20	2700	Nov 18	18:35:06	2456	8668	N	-a	1.2375	0.6101	-0.4352	218.0	-	-
65	21	2718	Nov 30	02:39:40	2558	8891	N	-a	1.2608	0.5701	-0.4808	212.5	-	-
66	22	2736	Dec 10	10:49:08	2663	9114	N	-a	1.2799	0.5376	-0.5183	207.8	-	-
67	23	2754	Dec 21	19:03:15	2769	9337	N	-a	1.2944	0.5134	-0.5472	204.3	-	-
68	24	2773	Jan 01	03:19:29	2878	9560	N	-a	1.3067	0.4928	-0.5717	201.3	-	-
69	25	2791	Jan 12	11:38:09	2988	9783	N	-a	1.3165	0.4765	-0.5914	198.9	-	-
70	26	2809	Jan 22	19:56:13	3101	10006	N	-h	1.3263	0.4598	-0.6107	196.3	-	-
71	27	2827	Feb 03	04:12:29	3216	10229	N	-h	1.3371	0.4410	-0.6314	193.2	-	-
72	28	2845	Feb 13	12:25:13	3333	10452	N	-h	1.3502	0.4177	-0.6561	188.9	-	-
73	29	2863	Feb 24	20:33:14	3451	10675	N	-h	1.3665	0.3882	-0.6864	183.1	-	-
74	30	2881	Mar 07	04:34:07	3572	10898	N	-t	1.3878	0.3491	-0.7256	174.7	-	-
75	31	2899	Mar 18	12:27:24	3695	11121	N	-t	1.4146	0.2998	-0.7748	163.0	-	-
76	32	2917	Mar 29	20:11:52	3821	11344	N	-t	1.4477	0.2389	-0.8350	146.6	-	-
77	33	2935	Apr 10	03:47:50	3948	11567	N	-t	1.4869	0.1665	-0.9066	123.4	-	-
78	34	2953	Apr 20	11:12:26	4077	11790	N	-t	1.5341	0.0792	-0.9928	86.0	-	-

SAROS SERIES

Saros series 138 contains 82 lunar eclipses.

PHASE													
DURATIONS													
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-47	1521 Oct 15 23:41:27	174	-5915	N	a-	1.5291	0.0386	-0.9345	53.1	-	-	
02	-46	1539 Oct 27 08:11:00	158	-5692	N	a-	1.5126	0.0709	-0.9063	71.9	-	-	
03	-45	1557 Nov 06 16:45:01	144	-5469	N	a-	1.5003	0.0955	-0.8857	83.5	-	-	
04	-44	1575 Nov 18 01:25:13	131	-5246	N	a-	1.4936	0.1097	-0.8751	89.6	-	-	
05	-43	1593 Dec 08 10:08:29	121	-5023	N	a-	1.4899	0.1180	-0.8701	93.1	-	-	
06	-42	1611 Dec 19 18:54:22	105	-4800	N	a-	1.4891	0.1208	-0.8700	94.4	-	-	
07	-41	1629 Dec 30 03:40:31	79	-4577	N	a-	1.4892	0.1219	-0.8713	95.0	-	-	
08	-40	1648 Jan 10 12:26:15	52	-4354	N	a-	1.4897	0.1219	-0.8730	95.3	-	-	
09	-39	1666 Jan 20 21:09:12	28	-4131	N	a-	1.4886	0.1246	-0.8717	96.6	-	-	
10	-38	1684 Feb 01 05:47:50	12	-3908	N	a-	1.4849	0.1319	-0.8653	99.6	-	-	
11	-37	1702 Feb 12 14:21:25	8	-3685	N	a-	1.4778	0.1451	-0.8527	104.6	-	-	
12	-36	1720 Feb 23 22:48:32	10	-3462	N	a-	1.4666	0.1659	-0.8322	111.9	-	-	
13	-35	1738 Mar 06 07:07:15	11	-3239	N	a-	1.4492	0.1978	-0.8003	122.2	-	-	
14	-34	1756 Mar 16 15:17:47	14	-3016	N	a-	1.4259	0.2406	-0.7575	134.6	-	-	
15	-33	1774 Mar 27 23:19:02	16	-2793	N	a-	1.3960	0.2955	-0.7026	148.9	-	-	
16	-32	1792 Apr 07 07:12:01	16	-2570	N	a-	1.3602	0.3611	-0.6370	164.1	-	-	
17	-31	1810 Apr 19 14:54:06	12	-2347	N	a-	1.3165	0.4414	-0.5570	180.6	-	-	

18	-30	1828 Apr 29 22:28:38	8	-2124	N h-	1.2674	0.5318	-0.4671	197.2	-	-
19	-29	1846 May 11 05:53:43	6	-1901	N h-	1.2111	0.6355	-0.3643	214.2	-	-
20	-28	1864 May 21 13:12:02	6	-1678	N h-	1.1502	0.7480	-0.2531	230.6	-	-
21	-27	1882 Jun 01 20:21:58	-5	-1455	N t-	1.0832	0.8717	-0.1311	246.8	-	-
22	-26	1900 Jun 13 03:27:37	-2	-1232	Nx t-	1.0134	1.0010	-0.0040	261.9	-	-
23	-25	1918 Jun 24 10:28:03	20	-1009	P t-	0.9397	1.1376	0.1297	276.3	82.4	-
24	-24	1936 Jul 04 17:25:23	24	-786	P t-	0.8642	1.2778	0.2668	289.5	116.3	-
25	-23	1954 Jul 16 00:20:51	31	-563	P t-	0.7876	1.4202	0.4054	301.6	140.9	-
26	-22	1972 Jul 26 07:16:22	43	-340	P t-	0.7116	1.5618	0.5427	312.4	160.1	-
27	-21	1990 Aug 06 14:13:16	57	-117	P t-	0.6374	1.7005	0.6766	322.0	175.5	-
28	-20	2008 Aug 16 21:11:12	66	106	P t-	0.5646	1.8366	0.8076	330.5	188.1	-
29	-19	2026 Aug 28 04:14:04	75	329	P t-	0.4964	1.9645	0.9299	337.8	198.1	-
30	-18	2044 Sep 07 11:20:44	88	552	T t-	0.4318	2.0860	1.0456	344.0	206.2	33.9
31	-17	2062 Sep 18 18:34:02	119	775	T p-	0.3735	2.1959	1.1496	349.3	212.4	59.5
32	-16	2080 Sep 29 01:52:42	158	998	T p-	0.3203	2.2967	1.2443	353.7	217.4	73.8
33	-15	2098 Oct 10 09:19:58	200	1221	T pp	0.2749	2.3831	1.3246	357.4	221.0	82.7
34	-14	2116 Oct 21 16:53:39	243	1444	T+ pp	0.2353	2.4586	1.3943	360.5	223.8	88.8
35	-13	2134 Nov 02 00:34:20	288	1667	T+ pp	0.2022	2.5222	1.4521	363.1	225.9	93.0
36	-12	2152 Nov 12 08:21:47	334	1890	T+ pp	0.1753	2.5743	1.4989	365.4	227.5	95.8
37	-11	2170 Nov 23 16:16:21	373	2113	T+ pp	0.1554	2.6134	1.5331	367.2	228.6	97.7
38	-10	2188 Dec 04 00:15:39	415	2336	T+ pp	0.1394	2.6448	1.5602	368.8	229.5	98.9
39	-09	2206 Dec 16 08:19:07	458	2559	T+ pp	0.1275	2.6685	1.5802	370.2	230.3	99.8
40	-08	2224 Dec 26 16:25:17	504	2782	T+ pp	0.1183	2.6868	1.5956	371.5	230.9	100.5
41	-07	2243 Jan 07 00:33:44	552	3005	T+ pp	0.1116	2.7004	1.6069	372.5	231.4	101.0
42	-06	2261 Jan 17 08:40:06	601	3228	T+ pp	0.1036	2.7157	1.6208	373.4	231.9	101.5
43	-05	2279 Jan 28 16:45:42	653	3451	T+ pp	0.0954	2.7312	1.6355	374.2	232.5	102.1
44	-04	2297 Feb 08 00:46:04	707	3674	T+ pp	0.0832	2.7535	1.6578	374.9	233.1	102.8
45	-03	2315 Feb 20 08:42:48	763	3897	T+ pp	0.0684	2.7804	1.6853	375.4	233.6	103.6

46	-02	2333	Mar 02	16:30:27	821	4120	T+	pp	0.0466	2.8198	1.7259	375.9	234.3	104.5	
47	-01	2351	Mar 14	00:12:41	881	4343	T+	pp	0.0207	2.8665	1.7744	376.3	234.8	105.1	
48	00	2369	Mar 24	07:44:15	943	4566	T-	pp	-0.0135	2.8786	1.7885	376.4	235.1	105.4	
49	01	2387	Apr 04	15:07:51	1007	4789	T-	pp	-0.0541	2.8029	1.7153	376.2	235.0	104.9	
50	02	2405	Apr 14	22:20:34	1074	5012	T-	pp	-0.1033	2.7113	1.6262	375.5	234.3	103.0	
51	03	2423	Apr 26	05:25:45	1142	5235	T-	pp	-0.1585	2.6086	1.5262	374.3	232.8	99.1	
52	04	2441	May 06	12:21:25	1212	5458	T-	pp	-0.2213	2.4921	1.4123	372.3	230.0	92.2	
53	05	2459	May 17	19:09:13	1285	5681	T	pt	-0.2904	2.3641	1.2869	369.4	225.7	80.8	
54	06	2477	May 28	01:49:59	1359	5904	T	-t	-0.3652	2.2255	1.1507	365.3	219.6	61.5	
55	07	2495	Jun 08	08:25:20	1436	6127	T	-t	-0.4447	2.0787	1.0060	360.0	211.2	12.9	
56	08	2513	Jun 19	14:55:56	1515	6350	P	-t	-0.5279	1.9251	0.8543	353.2	200.0	-	
57	09	2531	Jun 30	21:23:33	1596	6573	P	-t	-0.6134	1.7673	0.6981	344.9	185.7	-	
58	10	2549	Jul 11	03:50:12	1678	6796	P	-t	-0.7000	1.6079	0.5398	335.1	167.5	-	
59	11	2567	Jul 22	10:17:26	1763	7019	P	-t	-0.7862	1.4493	0.3821	323.8	144.4	-	
60	12	2585	Aug 01	16:45:35	1850	7242	P	-t	-0.8717	1.2920	0.2253	310.8	113.3	-	
61	13	2603	Aug 13	23:17:51	1940	7465	P	-t	-0.9539	1.1412	0.0746	296.6	66.6	-	
62	14	2621	Aug 24	05:54:22	2031	7688	N	-t	-1.0327	0.9968	-0.0701	281.1	-	-	
63	15	2639	Sep 04	12:37:54	2124	7911	N	-t	-1.1060	0.8625	-0.2049	264.8	-	-	
64	16	2657	Sep 14	19:26:58	2219	8134	N	-t	-1.1750	0.7364	-0.3318	247.4	-	-	
65	17	2675	Sep 26	02:25:48	2317	8357	N	-t	-1.2363	0.6242	-0.4449	229.9	-	-	
66	18	2693	Oct 06	09:32:29	2416	8580	N	-t	-1.2917	0.5232	-0.5469	212.2	-	-	
67	19	2711	Oct 18	16:49:35	2518	8803	N	-t	-1.3388	0.4372	-0.6339	195.2	-	-	
68	20	2729	Oct 29	00:15:40	2621	9026	N	-t	-1.3791	0.3637	-0.7084	178.9	-	-	
69	21	2747	Nov 09	07:52:28	2727	9249	N	-t	-1.4115	0.3048	-0.7681	164.4	-	-	
70	22	2765	Nov 19	15:38:17	2835	9472	N	-t	-1.4371	0.2580	-0.8155	151.5	-	-	
71	23	2783	Nov 30	23:32:00	2944	9695	N	-t	-1.4570	0.2215	-0.8521	140.6	-	-	
72	24	2801	Dec 11	07:34:19	3056	9918	N	-t	-1.4707	0.1962	-0.8771	132.3	-	-	
73	25	2819	Dec 22	15:42:44	3170	10141	N	-t	-1.4797	0.1794	-0.8931	126.3	-	-	

SAROS SERIES

139

												PHASE	
												DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													

01	-32	1658	Dec 09	20:10:47	37	-4219	N	t-	-1.5784	0.0141	-1.0897	37.2	-	-
02	-31	1676	Dec 20	04:11:44	17	-3996	N	t-	-1.5710	0.0285	-1.0768	52.9	-	-
03	-30	1694	Dec 31	12:13:59	8	-3773	N	t-	-1.5645	0.0405	-1.0653	63.1	-	-
04	-29	1713	Jan 11	20:14:55	9	-3550	N	t-	-1.5569	0.0545	-1.0513	73.0	-	-
05	-28	1731	Jan 23	04:14:13	11	-3327	N	t-	-1.5477	0.0709	-1.0338	83.2	-	-
06	-27	1749	Feb 02	12:09:42	13	-3104	N	t-	-1.5351	0.0931	-1.0100	95.2	-	-
07	-26	1767	Feb 13	19:59:03	15	-2881	N	t-	-1.5174	0.1244	-0.9764	109.6	-	-
08	-25	1785	Feb 24	03:42:22	17	-2658	N	t-	-1.4947	0.1647	-0.9331	125.5	-	-
09	-24	1803	Mar 08	11:17:40	13	-2435	N	t-	-1.4653	0.2167	-0.8776	143.2	-	-
10	-23	1821	Mar 18	18:44:59	11	-2212	N	t-	-1.4293	0.2810	-0.8095	161.8	-	-
11	-22	1839	Mar 30	02:03:05	5	-1989	N	t-	-1.3853	0.3595	-0.7269	181.4	-	-
12	-21	1857	Apr 09	09:13:19	7	-1766	N	t-	-1.3347	0.4503	-0.6318	201.0	-	-
13	-20	1875	Apr 20	16:15:23	-3	-1543	N	t-	-1.2770	0.5540	-0.5238	220.2	-	-
14	-19	1893	Apr 30	23:08:58	-6	-1320	N	t-	-1.2119	0.6713	-0.4023	239.2	-	-
15	-18	1911	May 13	05:56:24	12	-1097	N	t-	-1.1413	0.7987	-0.2706	257.0	-	-
16	-17	1929	May 23	12:37:45	24	-874	N	t-	-1.0650	0.9367	-0.1287	273.7	-	-
17	-16	1947	Jun 03	19:15:44	28	-651	P	t-	-0.9849	1.0818	0.0202	288.9	34.7	-
18	-15	1965	Jun 14	01:49:26	36	-428	P	t-	-0.9005	1.2351	0.1767	302.7	100.3	-
19	-14	1983	Jun 25	08:23:11	53	-205	P	t-	-0.8151	1.3901	0.3348	314.7	134.6	-
20	-13	2001	Jul 05	14:56:23	64	18	P	t-	-0.7287	1.5475	0.4947	325.1	159.3	-
21	-12	2019	Jul 16	21:31:55	71	241	P	t-	-0.6430	1.7037	0.6531	333.7	177.9	-
22	-11	2037	Jul 27	04:09:53	83	464	P	t-	-0.5582	1.8584	0.8095	340.8	192.4	-
23	-10	2055	Aug 07	10:53:18	104	687	P	t-	-0.4769	2.0069	0.9594	346.3	203.4	-
24	-09	2073	Aug 17	17:42:41	143	910	T	t-	-0.3998	2.1479	1.1013	350.5	211.6	50.1
25	-08	2091	Aug 29	00:38:25	183	1133	T	t-	-0.3270	2.2810	1.2351	353.4	217.5	72.9
26	-07	2109	Sep 09	07:43:03	226	1356	T	p-	-0.2608	2.4024	1.3568	355.2	221.6	85.6
27	-06	2127	Sep 20	14:56:04	270	1579	T	p-	-0.2007	2.5126	1.4672	356.2	224.2	93.5
28	-05	2145	Sep 30	22:19:51	317	1802	T	pp	-0.1486	2.6083	1.5628	356.5	225.7	98.2

29	-04	2163	Oct 12	05:51:53	358	2025	T-	pp	-0.1026	2.6927	1.6471	356.3	226.3	100.9
30	-03	2181	Oct 22	13:35:21	398	2248	T-	pp	-0.0652	2.7613	1.7157	355.7	226.3	102.2
31	-02	2199	Nov 02	21:27:11	441	2471	T-	pp	-0.0340	2.8187	1.7731	354.9	226.0	102.7
32	-01	2217	Nov 14	05:29:02	486	2694	T-	pp	-0.0100	2.8624	1.8171	353.9	225.5	102.6
33	00	2235	Nov 25	13:38:16	532	2917	T+	pp	0.0086	2.8647	1.8201	352.8	224.9	102.4
34	01	2253	Dec 05	21:55:59	581	3140	T+	pp	0.0213	2.8410	1.7974	351.6	224.2	102.0
35	02	2271	Dec 17	06:18:50	632	3363	T+	pp	0.0303	2.8236	1.7815	350.4	223.5	101.7
36	03	2289	Dec 27	14:46:24	685	3586	T+	pp	0.0364	2.8113	1.7713	349.1	222.9	101.4
37	04	2308	Jan 08	23:16:24	741	3809	T+	pp	0.0413	2.8010	1.7637	347.8	222.3	101.1
38	05	2326	Jan 19	07:48:32	798	4032	T+	pp	0.0454	2.7918	1.7577	346.4	221.7	100.9
39	06	2344	Jan 30	16:18:41	857	4255	T+	pp	0.0518	2.7782	1.7479	345.0	221.1	100.6
40	07	2362	Feb 10	00:47:27	918	4478	T+	pp	0.0599	2.7611	1.7352	343.5	220.5	100.3
41	08	2380	Feb 21	09:11:43	982	4701	T+	pp	0.0725	2.7355	1.7144	341.9	219.9	99.9
42	09	2398	Mar 03	17:32:53	1047	4924	T+	pp	0.0885	2.7036	1.6877	340.2	219.1	99.2
43	10	2416	Mar 14	01:45:55	1115	5147	T+	pp	0.1118	2.6579	1.6477	338.3	218.2	98.1
44	11	2434	Mar 25	09:54:38	1184	5370	T+	pp	0.1395	2.6043	1.5998	336.3	217.0	96.4
45	12	2452	Apr 04	17:54:43	1256	5593	T+	pp	0.1748	2.5366	1.5380	333.9	215.3	93.7
46	13	2470	Apr 16	01:49:49	1330	5816	T+	-p	0.2150	2.4598	1.4670	331.3	213.2	89.8
47	14	2488	Apr 26	09:36:10	1406	6039	T+	-p	0.2634	2.3681	1.3812	328.1	210.3	83.7
48	15	2506	May 08	17:18:30	1484	6262	T	-p	0.3158	2.2691	1.2877	324.5	206.6	75.1
49	16	2524	May 19	00:54:02	1564	6485	T	-p	0.3744	2.1589	1.1826	320.3	201.7	61.8
50	17	2542	May 30	08:25:22	1646	6708	T	-a	0.4375	2.0408	1.0695	315.3	195.5	39.4
51	18	2560	Jun 09	15:52:08	1730	6931	P	-a	0.5047	1.9153	0.9482	309.5	187.8	-
52	19	2578	Jun 20	23:17:05	1816	7154	P	-a	0.5741	1.7859	0.8228	302.9	178.4	-
53	20	2596	Jul 01	06:40:09	1904	7377	P	-a	0.6457	1.6529	0.6930	295.3	166.9	-
54	21	2614	Jul 13	14:02:30	1994	7600	P	-a	0.7183	1.5184	0.5612	286.9	153.0	-
55	22	2632	Jul 23	21:26:01	2087	7823	P	-a	0.7902	1.3854	0.4302	277.6	136.4	-
56	23	2650	Aug 04	04:51:39	2181	8046	P	-a	0.8606	1.2555	0.3017	267.6	116.2	-

57	24	2668	Aug 14	12:20:04	2278	8269	P	-a	0.9290	1.1295	0.1766	256.9	90.3	-
58	25	2686	Aug 25	19:52:22	2377	8492	P	-a	0.9946	1.0090	0.0563	245.6	51.8	-
59	26	2704	Sep 06	03:30:17	2477	8715	N	-a	1.0559	0.8968	-0.0562	233.9	-	-
60	27	2722	Sep 17	11:14:28	2580	8938	N	-a	1.1120	0.7941	-0.1596	222.2	-	-
61	28	2740	Sep 27	19:04:39	2685	9161	N	-a	1.1636	0.7000	-0.2549	210.3	-	-
62	29	2758	Oct 09	03:02:58	2792	9384	N	-a	1.2090	0.6176	-0.3388	199.0	-	-
63	30	2776	Oct 19	11:08:55	2901	9607	N	-a	1.2486	0.5458	-0.4124	188.3	-	-
64	31	2794	Oct 30	19:23:28	3012	9830	N	-a	1.2815	0.4863	-0.4738	178.7	-	-
65	32	2812	Nov 10	03:44:37	3125	10053	N	-a	1.3094	0.4361	-0.5260	170.0	-	-
66	33	2830	Nov 21	12:13:59	3240	10276	N	-a	1.3312	0.3973	-0.5668	162.8	-	-
67	34	2848	Dec 01	20:49:50	3357	10499	N	-a	1.3481	0.3670	-0.5989	156.9	-	-
68	35	2866	Dec 13	05:31:19	3477	10722	N	-a	1.3610	0.3442	-0.6234	152.3	-	-
69	36	2884	Dec 23	14:17:44	3598	10945	N	-a	1.3703	0.3280	-0.6410	148.9	-	-
70	37	2903	Jan 04	23:07:17	3722	11168	N	-a	1.3775	0.3152	-0.6546	146.2	-	-
71	38	2921	Jan 15	07:59:27	3847	11391	N	-a	1.3825	0.3062	-0.6643	144.3	-	-
72	39	2939	Jan 26	16:50:38	3975	11614	N	-a	1.3889	0.2946	-0.6760	141.7	-	-
73	40	2957	Feb 06	01:42:04	4105	11837	N	-a	1.3951	0.2832	-0.6872	139.1	-	-
74	41	2975	Feb 17	10:30:03	4236	12060	N	-a	1.4045	0.2655	-0.7043	135.0	-	-
75	42	2993	Feb 27	19:14:41	4370	12283	N	-a	1.4166	0.2428	-0.7260	129.4	-	-
76	43	3011	Mar 12	03:52:57	4506	12506	N	-a	1.4339	0.2105	-0.7571	120.9	-	-
77	44	3029	Mar 22	12:26:16	4644	12729	N	-a	1.4553	0.1706	-0.7956	109.3	-	-
78	45	3047	Apr 02	20:52:10	4784	12952	N	-a	1.4828	0.1193	-0.8454	91.9	-	-
79	46	3065	Apr 13	05:10:23	4926	13175	N	-a	1.5164	0.0568	-0.9063	63.9	-	-

SAROS SERIES

140

Saros series 140 contains 77 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-37	1597 Sep 25 13:40:53	120	-4976	N	a-	1.5117	0.0922	-0.9238	86.7	-	-		
02	-36	1615 Oct 06 21:30:17	100	-4753	N	a-	1.4676	0.1730	-0.8429	117.5	-	-		
03	-35	1633 Oct 17 05:29:19	73	-4530	N	a-	1.4306	0.2407	-0.7750	137.3	-	-		
04	-34	1651 Oct 28 13:37:37	46	-4307	N	a-	1.4003	0.2963	-0.7192	151.1	-	-		
05	-33	1669 Nov 07 21:54:08	23	-4084	N	a-	1.3760	0.3406	-0.6745	160.9	-	-		
06	-32	1687 Nov 19 06:18:50	10	-3861	N	a-	1.3575	0.3742	-0.6401	167.6	-	-		
07	-31	1705 Nov 30 14:50:04	9	-3638	N	a-	1.3439	0.3987	-0.6145	172.0	-	-		
08	-30	1723 Dec 11 23:25:51	10	-3415	N	a-	1.3333	0.4173	-0.5944	175.2	-	-		
09	-29	1741 Dec 22 08:05:41	12	-3192	N	a-	1.3256	0.4305	-0.5792	177.1	-	-		
10	-28	1760 Jan 02 16:47:25	14	-2969	N	a-	1.3191	0.4411	-0.5661	178.6	-	-		
11	-27	1778 Jan 13 01:29:24	17	-2746	N	a-	1.3124	0.4519	-0.5522	180.0	-	-		
12	-26	1796 Jan 24 10:09:20	15	-2523	N	a-	1.3035	0.4664	-0.5341	182.0	-	-		
13	-25	1814 Feb 04 18:47:01	12	-2300	N	a-	1.2926	0.4843	-0.5122	184.5	-	-		

14	-24	1832	Feb 16	03:20:41	7	-2077	N	a-	1.2783	0.5083	-0.4838	188.0	-	-
15	-23	1850	Feb 26	11:48:11	7	-1854	N	a-	1.2587	0.5420	-0.4453	192.8	-	-
16	-22	1868	Mar 08	20:09:48	3	-1631	N	a-	1.2339	0.5850	-0.3975	198.9	-	-
17	-21	1886	Mar 20	04:24:16	-6	-1408	N	a-	1.2029	0.6393	-0.3381	206.1	-	-
18	-20	1904	Mar 31	12:32:28	3	-1185	N	a-	1.1665	0.7036	-0.2688	214.2	-	-
19	-19	1922	Apr 11	20:32:12	23	-962	N	a-	1.1228	0.7812	-0.1863	223.2	-	-
20	-18	1940	Apr 22	04:26:25	25	-739	N	a-	1.0741	0.8683	-0.0945	232.5	-	-
21	-17	1958	May 03	12:13:29	32	-516	P	a-	1.0188	0.9676	0.0092	242.2	21.0	-
22	-16	1976	May 13	19:55:08	47	-293	P	a-	0.9585	1.0761	0.1217	251.8	75.4	-
23	-15	1994	May 25	03:31:20	60	-70	P	a-	0.8933	1.1941	0.2432	261.2	104.6	-
24	-14	2012	Jun 04	11:04:20	68	153	P	a-	0.8247	1.3183	0.3704	270.0	126.6	-
25	-13	2030	Jun 15	18:34:34	78	376	P	a-	0.7534	1.4480	0.5025	278.2	144.4	-
26	-12	2048	Jun 26	02:02:28	92	599	P	a-	0.6796	1.5825	0.6388	285.7	159.2	-
27	-11	2066	Jul 07	09:30:29	127	822	P	a-	0.6055	1.7179	0.7753	292.3	171.3	-
28	-10	2084	Jul 17	16:58:51	167	1045	P	a-	0.5312	1.8540	0.9119	298.1	181.4	-
29	-09	2102	Jul 30	00:29:10	209	1268	T	a-	0.4586	1.9873	1.0451	303.0	189.5	31.3
30	-08	2120	Aug 09	08:01:32	252	1491	T	a-	0.3875	2.1182	1.1751	307.1	195.9	59.3
31	-07	2138	Aug 20	15:38:46	298	1714	T	p-	0.3204	2.2421	1.2977	310.4	200.9	74.3
32	-06	2156	Aug 30	23:20:37	342	1937	T+	p-	0.2569	2.3595	1.4132	313.0	204.6	83.9
33	-05	2174	Sep 11	07:08:03	382	2160	T+	p-	0.1982	2.4683	1.5197	315.0	207.3	90.3
34	-04	2192	Sep 21	15:02:17	424	2383	T+	p-	0.1453	2.5668	1.6154	316.5	209.1	94.4
35	-03	2210	Oct 03	23:03:49	468	2606	T+	p-	0.0988	2.6537	1.6993	317.6	210.2	96.8
36	-02	2228	Oct 14	07:13:09	514	2829	T+	pp	0.0586	2.7290	1.7713	318.5	210.8	98.0
37	-01	2246	Oct 25	15:28:38	562	3052	T+	pp	0.0236	2.7950	1.8339	319.2	211.1	98.6
38	00	2264	Nov 04	23:52:49	612	3275	T-	pp	-0.0039	2.8330	1.8685	319.8	211.2	98.6
39	01	2282	Nov 16	08:23:04	664	3498	T-	pp	-0.0260	2.7939	1.8261	320.3	211.2	98.4
40	02	2300	Nov 27	17:00:33	719	3721	T-	p-	-0.0421	2.7660	1.7950	320.8	211.2	98.1
41	03	2318	Dec 09	01:41:59	775	3944	T-	p-	-0.0546	2.7445	1.7707	321.3	211.2	97.8

42	04	2336	Dec 19	10:28:54	833	4167	T-	-p	-0.0624	2.7315	1.7552	321.9	211.3	97.6
43	05	2354	Dec 30	19:17:27	894	4390	T-	-p	-0.0685	2.7214	1.7430	322.5	211.4	97.5
44	06	2373	Jan 10	04:07:33	956	4613	T-	-p	-0.0728	2.7144	1.7343	323.0	211.6	97.4
45	07	2391	Jan 21	12:56:41	1021	4836	T-	-p	-0.0775	2.7063	1.7249	323.6	211.8	97.3
46	08	2409	Jan 31	21:44:38	1088	5059	T-	-p	-0.0827	2.6972	1.7150	324.2	212.0	97.3
47	09	2427	Feb 12	06:28:08	1157	5282	T-	-p	-0.0913	2.6817	1.6991	324.7	212.2	97.1
48	10	2445	Feb 22	15:07:08	1227	5505	T-	-p	-0.1033	2.6598	1.6771	325.2	212.4	96.7
49	11	2463	Mar 05	23:39:34	1300	5728	T-	-p	-0.1201	2.6287	1.6462	325.5	212.5	96.1
50	12	2481	Mar 16	08:06:00	1375	5951	T-	-p	-0.1415	2.5893	1.6072	325.8	212.3	95.0
51	13	2499	Mar 27	16:22:54	1453	6174	T-	-p	-0.1705	2.5359	1.5542	325.9	211.9	93.1
52	14	2517	Apr 08	00:32:52	1532	6397	T-	-p	-0.2048	2.4726	1.4914	325.8	211.1	90.2
53	15	2535	Apr 19	08:33:01	1613	6620	T-	-p	-0.2470	2.3950	1.4141	325.3	209.6	85.6
54	16	2553	Apr 29	16:26:25	1696	6843	T	-p	-0.2942	2.3083	1.3276	324.4	207.4	78.8
55	17	2571	May 11	00:09:06	1782	7066	T	-a	-0.3498	2.2064	1.2255	322.8	204.0	67.9
56	18	2589	May 21	07:46:01	1869	7289	T	-a	-0.4096	2.0969	1.1156	320.5	199.4	50.5
57	19	2607	Jun 02	15:13:55	1959	7512	P	-a	-0.4765	1.9746	0.9923	317.3	193.0	-
58	20	2625	Jun 12	22:36:39	2050	7735	P	-a	-0.5468	1.8464	0.8628	313.2	184.8	-
59	21	2643	Jun 24	05:52:24	2144	7958	P	-a	-0.6220	1.7093	0.7237	307.8	173.8	-
60	22	2661	Jul 04	13:05:13	2240	8181	P	-a	-0.6987	1.5698	0.5818	301.2	160.0	-
61	23	2679	Jul 15	20:14:10	2337	8404	P	-a	-0.7779	1.4261	0.4350	293.3	142.0	-
62	24	2697	Jul 26	03:21:15	2437	8627	P	-a	-0.8574	1.2820	0.2873	283.9	118.4	-
63	25	2715	Aug 07	10:27:45	2539	8850	P	-a	-0.9365	1.1390	0.1402	273.1	84.7	-
64	26	2733	Aug 17	17:35:07	2643	9073	N	-a	-1.0138	0.9994	-0.0040	260.8	-	-
65	27	2751	Aug 29	00:44:37	2749	9296	N	-a	-1.0883	0.8653	-0.1432	247.2	-	-
66	28	2769	Sep 08	07:56:48	2858	9519	N	-a	-1.1596	0.7373	-0.2767	232.3	-	-
67	29	2787	Sep 19	15:14:14	2968	9742	N	-a	-1.2257	0.6188	-0.4009	216.3	-	-
68	30	2805	Sep 29	22:36:36	3080	9965	N	-a	-1.2869	0.5096	-0.5162	199.3	-	-
69	31	2823	Oct 11	06:05:12	3194	10188	N	-a	-1.3420	0.4116	-0.6203	181.6	-	-

70	32	2841	Oct 21	13:40:22	3311	10411	N	-a	-1.3909	0.3250	-0.7133	163.4	-	-
71	33	2859	Nov 01	21:23:01	3429	10634	N	-a	-1.4327	0.2514	-0.7930	145.3	-	-
72	34	2877	Nov 12	05:12:17	3550	10857	N	-a	-1.4686	0.1885	-0.8619	127.1	-	-
73	35	2895	Nov 23	13:07:29	3673	11080	N	-a	-1.4989	0.1358	-0.9203	108.9	-	-
74	36	2913	Dec 04	21:09:04	3797	11303	N	-a	-1.5232	0.0940	-0.9675	91.3	-	-
75	37	2931	Dec 16	05:16:05	3924	11526	N	-a	-1.5420	0.0619	-1.0044	74.6	-	-
76	38	2949	Dec 26	13:26:38	4053	11749	N	-h	-1.5575	0.0357	-1.0349	56.9	-	-
77	39	2968	Jan 06	21:40:03	4184	11972	N	-h	-1.5698	0.0149	-1.0594	36.9	-	-

SAROS SERIES

141

Saros series 141 contains 72 lunar eclipses.

													PHASE
													DURATIONS
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-38	1608 Aug 25	19:20:07	109	-4841	Nb a-	-1.5413	0.0062	-0.9471	21.1	-	-	

02	-37	1626	Sep 06	03:05:57	84	-4618	N	a-	-1.4897	0.1028	-0.8544	85.7	-	-
03	-36	1644	Sep 16	10:59:45	57	-4395	N	a-	-1.4448	0.1873	-0.7742	115.0	-	-
04	-35	1662	Sep 27	18:59:20	32	-4172	N	a-	-1.4052	0.2625	-0.7037	135.6	-	-
05	-34	1680	Oct 08	03:06:25	14	-3949	N	a-	-1.3719	0.3258	-0.6450	150.6	-	-
06	-33	1698	Oct 19	11:20:30	8	-3726	N	a-	-1.3447	0.3783	-0.5973	161.9	-	-
07	-32	1716	Oct 30	19:42:19	10	-3503	N	a-	-1.3238	0.4189	-0.5613	170.2	-	-
08	-31	1734	Nov 11	04:10:31	11	-3280	N	a-	-1.3088	0.4488	-0.5360	176.2	-	-
09	-30	1752	Nov 21	12:43:58	13	-3057	N	a-	-1.2983	0.4701	-0.5189	180.5	-	-
10	-29	1770	Dec 02	21:22:32	16	-2834	N	a-	-1.2926	0.4825	-0.5104	183.2	-	-
11	-28	1788	Dec 13	06:04:27	16	-2611	N	a-	-1.2898	0.4894	-0.5069	185.0	-	-
12	-27	1806	Dec 25	14:48:04	12	-2388	N	a-	-1.2891	0.4923	-0.5071	186.0	-	-
13	-26	1825	Jan 04	23:31:53	10	-2165	N	a-	-1.2890	0.4937	-0.5081	186.8	-	-
14	-25	1843	Jan 16	08:14:24	6	-1942	N	a-	-1.2885	0.4955	-0.5083	187.7	-	-
15	-24	1861	Jan 26	16:54:03	8	-1719	N	a-	-1.2864	0.5002	-0.5052	189.0	-	-
16	-23	1879	Feb 07	01:28:35	-5	-1496	N	a-	-1.2809	0.5108	-0.4956	191.4	-	-
17	-22	1897	Feb 17	09:57:44	-6	-1273	N	a-	-1.2717	0.5281	-0.4790	194.8	-	-
18	-21	1915	Mar 01	18:19:32	17	-1050	N	a-	-1.2573	0.5548	-0.4528	199.8	-	-
19	-20	1933	Mar 12	02:33:03	24	-827	N	a-	-1.2369	0.5923	-0.4154	206.3	-	-
20	-19	1951	Mar 23	10:37:33	30	-604	N	a-	-1.2099	0.6418	-0.3661	214.3	-	-
21	-18	1969	Apr 02	18:33:06	39	-381	N	a-	-1.1764	0.7033	-0.3047	223.7	-	-
22	-17	1987	Apr 14	02:19:50	55	-158	N	h-	-1.1364	0.7769	-0.2313	234.1	-	-
23	-16	2005	Apr 24	09:55:55	65	65	N	h-	-1.0885	0.8650	-0.1436	245.6	-	-
24	-15	2023	May 05	17:24:05	73	288	N	h-	-1.0349	0.9636	-0.0457	257.5	-	-
25	-14	2041	May 16	00:43:03	86	511	P	t-	-0.9746	1.0747	0.0645	269.7	58.5	-
26	-13	2059	May 27	07:55:35	112	734	P	t-	-0.9097	1.1946	0.1829	281.7	97.2	-
27	-12	2077	Jun 06	14:59:52	151	957	P	t-	-0.8387	1.3257	0.3123	293.6	125.0	-
28	-11	2095	Jun 17	22:00:11	192	1180	P	t-	-0.7653	1.4617	0.4459	304.7	146.9	-
29	-10	2113	Jun 29	04:55:26	235	1403	P	t-	-0.6887	1.6035	0.5849	315.1	165.2	-

30	-09	2131	Jul 10	11:47:56	280	1626	P	t-	-0.6107	1.7483	0.7265	324.5	180.4	-
31	-08	2149	Jul 20	18:38:11	327	1849	P	t-	-0.5315	1.8957	0.8700	333.1	193.2	-
32	-07	2167	Aug 01	01:28:59	366	2072	T	t-	-0.4536	2.0407	1.0108	340.5	203.6	16.6
33	-06	2185	Aug 11	08:20:59	407	2295	T	t-	-0.3774	2.1828	1.1482	346.9	212.0	59.3
34	-05	2203	Aug 23	15:15:12	450	2518	T	pp	-0.3039	2.3203	1.2806	352.2	218.6	78.1
35	-04	2221	Sep 02	22:13:42	495	2741	T-	pp	-0.2348	2.4498	1.4048	356.6	223.5	89.7
36	-03	2239	Sep 14	05:17:34	543	2964	T-	pp	-0.1708	2.5701	1.5194	360.2	227.0	97.0
37	-02	2257	Sep 24	12:27:34	592	3187	T-	pp	-0.1123	2.6802	1.6239	363.1	229.3	101.4
38	-01	2275	Oct 05	19:44:07	643	3410	T-	pp	-0.0599	2.7794	1.7172	365.3	230.8	103.7
39	00	2293	Oct 16	03:08:18	697	3633	T-	pp	-0.0144	2.8658	1.7979	367.1	231.6	104.6
40	01	2311	Oct 28	10:40:16	752	3856	T+	pp	0.0241	2.8509	1.7773	368.6	231.9	104.5
41	02	2329	Nov 07	18:18:33	810	4079	T+	pp	0.0568	2.7935	1.7146	369.8	231.9	103.7
42	03	2347	Nov 19	02:04:59	870	4302	T+	pp	0.0825	2.7489	1.6651	370.8	231.8	102.7
43	04	2365	Nov 29	09:57:07	931	4525	T+	pp	0.1031	2.7133	1.6251	371.8	231.6	101.7
44	05	2383	Dec 10	17:55:40	995	4748	T+	pp	0.1179	2.6881	1.5961	372.6	231.5	100.8
45	06	2401	Dec 21	01:56:07	1061	4971	T+	pp	0.1306	2.6663	1.5711	373.3	231.4	99.9
46	07	2420	Jan 01	10:00:56	1129	5194	T+	pp	0.1394	2.6514	1.5539	374.0	231.4	99.2
47	08	2438	Jan 11	18:05:30	1199	5417	T+	pp	0.1483	2.6358	1.5366	374.5	231.3	98.5
48	09	2456	Jan 23	02:10:08	1271	5640	T+	pp	0.1568	2.6207	1.5206	374.9	231.3	97.9
49	10	2474	Feb 02	10:11:05	1346	5863	T+	pp	0.1681	2.6001	1.4998	375.0	231.1	96.9
50	11	2492	Feb 13	18:09:20	1422	6086	T+	pp	0.1814	2.5754	1.4757	375.0	230.7	95.6
51	12	2510	Feb 25	02:01:15	1500	6309	T+	pp	0.1998	2.5411	1.4426	374.6	230.1	93.7
52	13	2528	Mar 07	09:46:47	1581	6532	T+	pp	0.2233	2.4970	1.4003	373.9	229.1	90.8
53	14	2546	Mar 18	17:24:17	1663	6755	T+	-p	0.2534	2.4406	1.3462	372.7	227.5	86.4
54	15	2564	Mar 29	00:54:06	1748	6978	T	-p	0.2895	2.3731	1.2813	371.1	225.2	79.9
55	16	2582	Apr 09	08:13:59	1834	7201	T	-t	0.3337	2.2904	1.2017	368.7	221.9	69.7
56	17	2600	Apr 20	15:25:41	1923	7424	T	-t	0.3845	2.1957	1.1101	365.5	217.3	53.2
57	18	2618	May 01	22:28:05	2014	7647	T	-t	0.4426	2.0873	1.0049	361.4	211.1	11.6

58	19	2636	May 12	05:23:36	2107	7870	P	-t	0.5064	1.9687	0.8894	356.1	202.9	-
59	20	2654	May 23	12:09:21	2202	8093	P	-t	0.5779	1.8359	0.7597	349.4	191.8	-
60	21	2672	Jun 02	18:50:39	2299	8316	P	-t	0.6528	1.6971	0.6238	341.3	177.8	-
61	22	2690	Jun 14	01:25:03	2398	8539	P	-t	0.7329	1.5487	0.4780	331.4	159.2	-
62	23	2708	Jun 25	07:57:36	2499	8762	P	-t	0.8147	1.3974	0.3292	319.9	135.1	-
63	24	2726	Jul 06	14:25:33	2602	8985	P	-t	0.9000	1.2399	0.1736	306.2	100.2	-
64	25	2744	Jul 16	20:55:09	2707	9208	P	-t	0.9841	1.0848	0.0202	290.8	34.9	-
65	26	2762	Jul 28	03:24:16	2815	9431	N	-t	1.0681	0.9301	-0.1333	273.2	-	-
66	27	2780	Aug 07	09:56:19	2924	9654	N	-t	1.1498	0.7796	-0.2829	253.5	-	-
67	28	2798	Aug 18	16:31:28	3035	9877	N	-t	1.2293	0.6336	-0.4284	231.4	-	-
68	29	2816	Aug 28	23:13:01	3149	10100	N	-t	1.3037	0.4969	-0.5648	207.2	-	-
69	30	2834	Sep 09	06:01:06	3265	10323	N	-t	1.3730	0.3698	-0.6920	180.6	-	-
70	31	2852	Sep 19	12:56:17	3382	10546	N	-t	1.4368	0.2528	-0.8093	150.6	-	-
71	32	2870	Sep 30	20:00:43	3502	10769	N	-t	1.4935	0.1491	-0.9136	116.5	-	-
72	33	2888	Oct 11	03:14:10	3624	10992	N	-t	1.5434	0.0578	-1.0055	72.9	-	-

SAROS SERIES

142

Saros series 142 contains 73 lunar eclipses.

													PHASE	
													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-33	1709 Sep 19 00:30:48	9	-3591	Nb	t-	1.5439	0.0642	-1.0136	78.2	-	-		
02	-32	1727 Sep 30 07:40:13	10	-3368	N	t-	1.4949	0.1565	-0.9259	121.5	-	-		
03	-31	1745 Oct 10 14:56:57	12	-3145	N	t-	1.4515	0.2385	-0.8485	149.2	-	-		
04	-30	1763 Oct 21 22:22:45	15	-2922	N	t-	1.4153	0.3071	-0.7842	168.6	-	-		
05	-29	1781 Nov 01 05:56:11	17	-2699	N	t-	1.3850	0.3646	-0.7308	183.0	-	-		
06	-28	1799 Nov 12 13:38:20	14	-2476	N	t-	1.3618	0.4090	-0.6897	193.4	-	-		
07	-27	1817 Nov 23 21:26:57	12	-2253	N	t-	1.3435	0.4441	-0.6577	201.1	-	-		
08	-26	1835 Dec 05 05:20:19	6	-2030	N	t-	1.3290	0.4717	-0.6322	206.9	-	-		
09	-25	1853 Dec 15 13:18:43	7	-1807	N	t-	1.3186	0.4917	-0.6138	211.0	-	-		
10	-24	1871 Dec 26 21:19:33	-1	-1584	N	t-	1.3105	0.5068	-0.5995	213.9	-	-		
11	-23	1890 Jan 06 05:21:26	-6	-1361	N	t-	1.3029	0.5209	-0.5854	216.6	-	-		
12	-22	1908 Jan 18 13:21:36	8	-1138	N	t-	1.2939	0.5370	-0.5685	219.5	-	-		
13	-21	1926 Jan 28 21:20:24	24	-915	N	t-	1.2836	0.5551	-0.5488	222.6	-	-		
14	-20	1944 Feb 09 05:14:57	26	-692	N	t-	1.2698	0.5792	-0.5223	226.7	-	-		
15	-19	1962 Feb 19 13:03:42	34	-469	N	t-	1.2511	0.6120	-0.4865	231.9	-	-		
16	-18	1980 Mar 01 20:46:03	51	-246	N	t-	1.2269	0.6545	-0.4405	238.5	-	-		
17	-17	1998 Mar 13 04:21:08	63	-23	N	t-	1.1964	0.7086	-0.3824	246.4	-	-		
18	-16	2016 Mar 23 11:48:21	70	200	N	t-	1.1591	0.7747	-0.3118	255.4	-	-		
19	-15	2034 Apr 03 19:06:59	80	423	N	t-	1.1144	0.8545	-0.2274	265.4	-	-		
20	-14	2052 Apr 14 02:18:06	98	646	N	t-	1.0628	0.9466	-0.1305	276.0	-	-		

21	-13	2070	Apr 25	09:21:24	135	869	Nx	t-	1.0044	1.0515	-0.0209	286.9	-	-
22	-12	2088	May 05	16:16:50	175	1092	P	t-	0.9387	1.1695	0.1019	297.9	77.1	-
23	-11	2106	May 17	23:06:43	218	1315	P	t-	0.8677	1.2975	0.2345	308.4	114.5	-
24	-10	2124	May 28	05:50:59	262	1538	P	t-	0.7913	1.4356	0.3770	318.4	141.9	-
25	-09	2142	Jun 08	12:32:42	308	1761	P	t-	0.7118	1.5794	0.5247	327.2	163.2	-
26	-08	2160	Jun 18	19:10:10	350	1984	P	t-	0.6280	1.7313	0.6804	335.2	180.8	-
27	-07	2178	Jun 30	01:48:39	391	2207	P	t-	0.5438	1.8841	0.8364	341.8	194.6	-
28	-06	2196	Jul 10	08:26:05	433	2430	P	t-	0.4577	2.0407	0.9960	347.3	205.8	-
29	-05	2214	Jul 22	15:06:54	477	2653	T	t-	0.3734	2.1941	1.1518	351.4	214.2	60.4
30	-04	2232	Aug 01	21:49:49	524	2876	T	t-	0.2898	2.3464	1.3061	354.3	220.4	81.1
31	-03	2250	Aug 13	04:39:38	572	3099	T+	pp	0.2108	2.4907	1.4520	356.0	224.5	92.9
32	-02	2268	Aug 23	11:34:51	623	3322	T+	pp	0.1351	2.6290	1.5915	356.7	226.9	99.8
33	-01	2286	Sep 03	18:37:54	675	3545	T+	pp	0.0648	2.7576	1.7209	356.6	227.8	103.2
34	00	2304	Sep 15	01:48:59	730	3768	T+	pp	0.0003	2.8756	1.8394	355.7	227.6	103.9
35	01	2322	Sep 26	09:09:54	787	3991	T-	pp	-0.0568	2.7718	1.7360	354.3	226.5	102.8
36	02	2340	Oct 06	16:39:55	846	4214	T-	pp	-0.1074	2.6788	1.6431	352.6	224.9	100.4
37	03	2358	Oct 18	00:19:34	907	4437	T-	pp	-0.1509	2.5990	1.5634	350.7	222.9	97.2
38	04	2376	Oct 28	08:09:00	970	4660	T-	pp	-0.1871	2.5326	1.4971	348.7	220.9	93.7
39	05	2394	Nov 08	16:08:09	1035	4883	T-	pp	-0.2159	2.4796	1.4443	346.8	218.9	90.3
40	06	2412	Nov 19	00:15:25	1102	5106	T-	p	-0.2386	2.4377	1.4030	345.0	217.1	87.1
41	07	2430	Nov 30	08:31:15	1171	5329	T-	p	-0.2548	2.4076	1.3735	343.3	215.5	84.6
42	08	2448	Dec 10	16:53:19	1243	5552	T-	p	-0.2667	2.3852	1.3524	341.7	214.2	82.6
43	09	2466	Dec 22	01:21:41	1316	5775	T	p	-0.2740	2.3710	1.3398	340.3	213.2	81.3
44	10	2485	Jan 01	09:52:20	1391	5998	T	p	-0.2800	2.3588	1.3298	338.8	212.3	80.2
45	11	2503	Jan 13	18:27:08	1469	6221	T	p	-0.2833	2.3514	1.3250	337.4	211.6	79.6
46	12	2521	Jan 24	03:01:30	1549	6444	T	p	-0.2872	2.3426	1.3195	336.0	210.8	78.9
47	13	2539	Feb 04	11:35:58	1630	6667	T	p	-0.2921	2.3317	1.3124	334.5	210.1	78.1
48	14	2557	Feb 14	20:06:30	1714	6890	T	p	-0.3008	2.3135	1.2986	332.7	209.0	76.6

49	15	2575	Feb 26	04:34:54	1800	7113	T	-p	-0.3120	2.2906	1.2805	330.8	207.9	74.6
50	16	2593	Mar 08	12:57:32	1888	7336	T	-p	-0.3284	2.2579	1.2528	328.7	206.3	71.4
51	17	2611	Mar 20	21:14:33	1978	7559	T	-p	-0.3502	2.2152	1.2156	326.2	204.3	66.6
52	18	2629	Mar 31	05:24:37	2070	7782	T	-p	-0.3783	2.1609	1.1668	323.3	201.6	59.5
53	19	2647	Apr 11	13:28:29	2164	8005	T	-p	-0.4123	2.0956	1.1071	320.0	198.2	48.5
54	20	2665	Apr 21	21:25:02	2260	8228	T	-a	-0.4528	2.0184	1.0355	316.1	193.8	28.5
55	21	2683	May 03	05:14:46	2358	8451	P	-a	-0.4996	1.9298	0.9523	311.5	188.3	-
56	22	2701	May 14	12:58:21	2459	8674	P	-a	-0.5522	1.8308	0.8584	306.2	181.4	-
57	23	2719	May 25	20:36:44	2561	8897	P	-a	-0.6097	1.7228	0.7552	300.1	172.7	-
58	24	2737	Jun 05	04:09:30	2665	9120	P	-a	-0.6726	1.6053	0.6421	292.9	161.9	-
59	25	2755	Jun 16	11:39:21	2772	9343	P	-a	-0.7384	1.4826	0.5233	284.8	148.6	-
60	26	2773	Jun 26	19:05:54	2881	9566	P	-a	-0.8076	1.3539	0.3979	275.5	131.8	-
61	27	2791	Jul 08	02:32:22	2991	9789	P	-a	-0.8773	1.2245	0.2713	265.2	110.6	-
62	28	2809	Jul 18	09:56:45	3104	10012	P	-a	-0.9494	1.0913	0.1402	253.5	80.9	-
63	29	2827	Jul 29	17:23:45	3219	10235	P	-a	-1.0197	0.9614	0.0119	240.7	23.9	-
64	30	2845	Aug 09	00:51:23	3336	10458	N	-a	-1.0901	0.8318	-0.1169	226.6	-	-
65	31	2863	Aug 20	08:23:18	3455	10681	N	-a	-1.1571	0.7087	-0.2396	211.5	-	-
66	32	2881	Aug 30	15:58:08	3576	10904	N	-a	-1.2220	0.5897	-0.3589	194.9	-	-
67	33	2899	Sep 10	23:39:29	3699	11127	N	-a	-1.2819	0.4802	-0.4692	177.6	-	-
68	34	2917	Sep 22	07:26:14	3824	11350	N	-a	-1.3377	0.3786	-0.5721	159.1	-	-
69	35	2935	Oct 03	15:19:37	3951	11573	N	-a	-1.3883	0.2866	-0.6658	139.6	-	-
70	36	2953	Oct 13	23:20:11	4081	11796	N	-a	-1.4331	0.2052	-0.7492	119.0	-	-
71	37	2971	Oct 25	07:28:21	4212	12019	N	-a	-1.4719	0.1352	-0.8214	97.2	-	-
72	38	2989	Nov 04	15:44:27	4345	12242	N	-a	-1.5048	0.0761	-0.8830	73.3	-	-
73	39	3007	Nov 17	00:06:57	4481	12465	N	-a	-1.5328	0.0260	-0.9354	43.0	-	-

SAROS SERIES

143

Saros series 143 contains 72 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-35	1720 Aug 18 02:31:47	10	-3456	N	a-	-1.4936	0.1213	-0.8866	99.2	-	-		
02	-34	1738 Aug 29 09:51:16	11	-3233	N	a-	-1.4268	0.2433	-0.7636	138.5	-	-		
03	-33	1756 Sep 08 17:19:28	14	-3010	N	a-	-1.3658	0.3549	-0.6514	165.0	-	-		
04	-32	1774 Sep 20 00:57:04	16	-2787	N	a-	-1.3118	0.4539	-0.5520	184.2	-	-		
05	-31	1792 Sep 30 08:43:05	16	-2564	N	a-	-1.2636	0.5423	-0.4634	199.0	-	-		
06	-30	1810 Oct 12 16:39:20	12	-2341	N	a-	-1.2230	0.6167	-0.3889	210.1	-	-		
07	-29	1828 Oct 23 00:44:42	8	-2118	N	a-	-1.1889	0.6793	-0.3263	218.5	-	-		
08	-28	1846 Nov 03 08:59:23	6	-1895	N	a-	-1.1618	0.7287	-0.2766	224.5	-	-		
09	-27	1864 Nov 13 17:21:25	6	-1672	N	a-	-1.1402	0.7683	-0.2367	228.9	-	-		
10	-26	1882 Nov 25 01:51:01	-6	-1449	N	a-	-1.1243	0.7972	-0.2071	231.8	-	-		
11	-25	1900 Dec 06 10:26:29	-1	-1226	N	a-	-1.1125	0.8183	-0.1851	233.7	-	-		
12	-24	1918 Dec 17 19:06:01	21	-1003	N	a-	-1.1035	0.8340	-0.1679	234.9	-	-		
13	-23	1936 Dec 28 03:49:09	24	-780	N	a-	-1.0970	0.8451	-0.1550	235.5	-	-		

14	-22	1955 Jan 08 12:33:20	31	-557	N	a-	-1.0906	0.8555	-0.1421	236.0	-	-
15	-21	1973 Jan 18 21:17:58	43	-334	N	a-	-1.0844	0.8655	-0.1293	236.5	-	-
16	-20	1991 Jan 30 05:59:38	58	-111	N	a-	-1.0752	0.8807	-0.1106	237.5	-	-
17	-19	2009 Feb 09 14:39:22	66	112	N	a-	-1.0640	0.8994	-0.0882	238.8	-	-
18	-18	2027 Feb 20 23:14:06	76	335	N	a-	-1.0480	0.9266	-0.0569	241.0	-	-
19	-17	2045 Mar 03 07:43:26	89	558	N	a-	-1.0274	0.9623	-0.0168	243.9	-	-
20	-16	2063 Mar 14 16:05:49	120	781	P	a-	-1.0007	1.0088	0.0342	247.8	40.6	-
21	-15	2081 Mar 25 00:22:01	159	1004	P	a-	-0.9687	1.0652	0.0953	252.4	67.1	-
22	-14	2099 Apr 05 08:30:56	201	1227	P	a-	-0.9304	1.1333	0.1680	257.7	88.1	-
23	-13	2117 Apr 16 16:32:00	244	1450	P	a-	-0.8852	1.2139	0.2530	263.7	106.6	-
24	-12	2135 Apr 28 00:26:35	289	1673	P	a-	-0.8344	1.3051	0.3483	269.9	123.2	-
25	-11	2153 May 08 08:14:39	335	1896	P	a-	-0.7781	1.4065	0.4535	276.3	138.3	-
26	-10	2171 May 19 15:56:55	374	2119	P	a-	-0.7166	1.5175	0.5680	282.7	151.9	-
27	-09	2189 May 29 23:34:01	416	2342	P	a-	-0.6505	1.6375	0.6909	288.8	164.1	-
28	-08	2207 Jun 11 07:07:39	460	2565	P	a-	-0.5811	1.7634	0.8193	294.5	174.8	-
29	-07	2225 Jun 21 14:38:56	505	2788	P	a-	-0.5097	1.8936	0.9512	299.7	183.9	-
30	-06	2243 Jul 02 22:07:19	553	3011	T	a-	-0.4355	2.0292	1.0880	304.3	191.8	43.2
31	-05	2261 Jul 13 05:36:18	603	3234	T	p-	-0.3617	2.1643	1.2235	308.2	198.1	66.0
32	-04	2279 Jul 24 13:05:07	654	3457	T	p-	-0.2877	2.3002	1.3593	311.4	203.1	79.9
33	-03	2297 Aug 03 20:37:10	708	3680	T-	p-	-0.2162	2.4317	1.4901	313.9	206.8	88.9
34	-02	2315 Aug 16 04:10:27	764	3903	T-	p-	-0.1459	2.5616	1.6185	315.7	209.3	94.7
35	-01	2333 Aug 26 11:49:39	822	4126	T-	pp	-0.0807	2.6822	1.7372	317.0	210.8	97.9
36	00	2351 Sep 06 19:32:42	883	4349	T-	pp	-0.0188	2.7969	1.8495	317.7	211.4	99.1
37	01	2369 Sep 17 03:22:09	945	4572	T+	pp	0.0374	2.7643	1.8139	318.1	211.3	98.8
38	02	2387 Sep 28 11:16:56	1009	4795	T+	-p	0.0890	2.6712	1.7176	318.1	210.7	97.3
39	03	2405 Oct 08 19:19:56	1075	5018	T+	-p	0.1336	2.5913	1.6341	318.1	209.7	95.1
40	04	2423 Oct 20 03:29:19	1144	5241	T+	-p	0.1723	2.5221	1.5612	317.9	208.6	92.3
41	05	2441 Oct 30 11:45:56	1214	5464	T+	-p	0.2048	2.4645	1.4997	317.8	207.4	89.3

42	06	2459	Nov 10	20:09:31	1287	5687	T+	-p	0.2312	2.4179	1.4492	317.7	206.3	86.3
43	07	2477	Nov 21	04:40:34	1361	5910	T+	-p	0.2515	2.3825	1.4101	317.8	205.4	83.8
44	08	2495	Dec 02	13:16:56	1438	6133	T+	-p	0.2671	2.3557	1.3799	318.0	204.8	81.6
45	09	2513	Dec 13	21:58:14	1517	6356	T	-p	0.2783	2.3367	1.3576	318.4	204.3	79.8
46	10	2531	Dec 25	06:43:03	1598	6579	T	-p	0.2865	2.3231	1.3412	318.8	204.0	78.5
47	11	2550	Jan 04	15:31:00	1681	6802	T	-p	0.2921	2.3141	1.3299	319.4	203.9	77.6
48	12	2568	Jan 16	00:18:34	1766	7025	T	-p	0.2977	2.3047	1.3185	319.9	203.9	76.7
49	13	2586	Jan 26	09:06:34	1853	7248	T	-p	0.3029	2.2960	1.3083	320.5	203.9	75.8
50	14	2604	Feb 07	17:51:11	1942	7471	T	-p	0.3106	2.2824	1.2936	320.9	203.7	74.5
51	15	2622	Feb 18	02:32:59	2033	7694	T	-p	0.3201	2.2652	1.2758	321.2	203.5	72.8
52	16	2640	Feb 29	11:07:48	2126	7917	T	-p	0.3353	2.2376	1.2478	321.3	202.8	69.8
53	17	2658	Mar 11	19:37:41	2222	8140	T	-p	0.3539	2.2034	1.2136	321.2	201.9	65.7
54	18	2676	Mar 22	03:59:06	2319	8363	T	-a	0.3793	2.1567	1.1670	320.6	200.3	59.1
55	19	2694	Apr 02	12:12:44	2419	8586	T	-a	0.4106	2.0993	1.1098	319.7	198.0	49.0
56	20	2712	Apr 13	20:16:52	2520	8809	T	-a	0.4490	2.0286	1.0393	318.2	194.7	30.0
57	21	2730	Apr 25	04:13:03	2624	9032	P	-a	0.4934	1.9471	0.9579	316.1	190.3	-
58	22	2748	May 05	12:00:09	2730	9255	P	-a	0.5449	1.8527	0.8633	313.1	184.3	-
59	23	2766	May 16	19:38:18	2837	9478	P	-a	0.6030	1.7462	0.7565	309.1	176.2	-
60	24	2784	May 27	03:08:54	2947	9701	P	-a	0.6667	1.6298	0.6392	304.0	165.7	-
61	25	2802	Jun 07	10:32:24	3059	9924	P	-a	0.7352	1.5047	0.5129	297.6	151.9	-
62	26	2820	Jun 17	17:49:32	3173	10147	P	-a	0.8082	1.3715	0.3781	289.6	133.5	-
63	27	2838	Jun 29	01:01:07	3289	10370	P	-a	0.8850	1.2318	0.2362	279.9	108.1	-
64	28	2856	Jul 09	08:09:01	3408	10593	P	-a	0.9636	1.0889	0.0906	268.4	68.6	-
65	29	2874	Jul 20	15:14:11	3528	10816	N	-a	1.0433	0.9443	-0.0571	254.9	-	-
66	30	2892	Jul 30	22:16:27	3650	11039	N	-a	1.1241	0.7979	-0.2074	238.9	-	-
67	31	2910	Aug 12	05:19:18	3774	11262	N	-h	1.2032	0.6549	-0.3546	220.6	-	-
68	32	2928	Aug 22	12:22:23	3901	11485	N	-h	1.2807	0.5150	-0.4992	199.2	-	-
69	33	2946	Sep 02	19:28:48	4029	11708	N	-h	1.3545	0.3824	-0.6370	174.6	-	-

70	34	2964	Sep 13	02:37:10	4160	11931	N	-h	1.4252	0.2553	-0.7696	145.0	-	-
71	35	2982	Sep 24	09:51:36	4293	12154	N	-h	1.4899	0.1396	-0.8911	108.8	-	-
72	36	3000	Oct 05	17:10:38	4427	12377	Ne	-h	1.5497	0.0329	-1.0039	53.5	-	-

SAROS SERIES

144

Saros series 144 contains 71 lunar eclipses.

													PHASE
													DURATIONS
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-37	1749 Jul 29	16:31:02	13	-3098	Nb a-	1.5083	0.0642	-0.8842	67.7	-	-	
02	-36	1767 Aug 10	00:02:55	16	-2875	N a-	1.4447	0.1826	-0.7690	113.2	-	-	
03	-35	1785 Aug 20	07:38:39	17	-2652	N a-	1.3843	0.2953	-0.6598	142.9	-	-	
04	-34	1803 Sep 01	15:19:10	12	-2429	N a-	1.3282	0.4003	-0.5589	165.1	-	-	
05	-33	1821 Sep 11	23:04:56	11	-2206	N a-	1.2766	0.4971	-0.4666	182.9	-	-	
06	-32	1839 Sep 23	06:57:39	5	-1983	N a-	1.2311	0.5830	-0.3855	197.0	-	-	

07	-31	1857	Oct 03	14:56:57	7	-1760	N	a-	1.1914	0.6585	-0.3150	208.4	-	-
08	-30	1875	Oct 14	23:02:55	-4	-1537	N	a-	1.1577	0.7228	-0.2558	217.7	-	-
09	-29	1893	Oct 25	07:16:16	-6	-1314	N	a-	1.1305	0.7753	-0.2084	225.0	-	-
10	-28	1911	Nov 06	15:36:45	13	-1091	N	a-	1.1100	0.8154	-0.1733	230.6	-	-
11	-27	1929	Nov 17	00:03:13	24	-868	N	a-	1.0947	0.8460	-0.1474	235.0	-	-
12	-26	1947	Nov 28	08:34:29	28	-645	N	a-	1.0838	0.8683	-0.1297	238.3	-	-
13	-25	1965	Dec 08	17:10:32	36	-422	N	a-	1.0774	0.8820	-0.1201	240.7	-	-
14	-24	1983	Dec 20	01:49:57	54	-199	N	a-	1.0746	0.8890	-0.1167	242.3	-	-
15	-23	2001	Dec 30	10:30:22	64	24	N	a-	1.0731	0.8933	-0.1155	243.5	-	-
16	-22	2020	Jan 10	19:11:11	72	247	N	a-	1.0726	0.8956	-0.1160	244.6	-	-
17	-21	2038	Jan 21	03:49:52	83	470	N	a-	1.0710	0.8996	-0.1140	245.8	-	-
18	-20	2056	Feb 01	12:26:06	105	693	N	a-	1.0682	0.9056	-0.1096	247.2	-	-
19	-19	2074	Feb 11	20:55:58	144	916	N	a-	1.0611	0.9191	-0.0972	249.5	-	-
20	-18	2092	Feb 23	05:20:59	184	1139	N	a-	1.0509	0.9383	-0.0789	252.4	-	-
21	-17	2110	Mar 06	13:37:20	227	1362	N	a-	1.0345	0.9686	-0.0491	256.4	-	-
22	-16	2128	Mar 16	21:46:08	271	1585	Nx	a-	1.0128	1.0086	-0.0093	261.3	-	-
23	-15	2146	Mar 28	05:44:28	318	1808	P	a-	0.9832	1.0629	0.0448	267.6	48.6	-
24	-14	2164	Apr 07	13:34:34	359	2031	P	h-	0.9479	1.1278	0.1095	274.6	75.5	-
25	-13	2182	Apr 18	21:14:14	399	2254	P	h-	0.9049	1.2068	0.1883	282.5	98.3	-
26	-12	2200	Apr 30	04:44:34	442	2477	P	t-	0.8550	1.2987	0.2797	291.1	118.6	-
27	-11	2218	May 11	12:05:34	487	2700	P	t-	0.7980	1.4036	0.3839	300.0	137.2	-
28	-10	2236	May 21	19:18:51	534	2923	P	t-	0.7352	1.5194	0.4987	309.1	154.2	-
29	-09	2254	Jun 02	02:24:40	583	3146	P	t-	0.6670	1.6452	0.6231	317.9	169.5	-
30	-08	2272	Jun 12	09:23:36	634	3369	P	t-	0.5938	1.7804	0.7565	326.5	183.3	-
31	-07	2290	Jun 23	16:17:39	687	3592	P	t-	0.5172	1.9221	0.8959	334.4	195.3	-
32	-06	2308	Jul 04	23:07:47	742	3815	T	t-	0.4377	2.0694	1.0404	341.6	205.5	31.9
33	-05	2326	Jul 16	05:54:47	799	4038	T	p-	0.3565	2.2200	1.1878	347.8	214.0	65.9
34	-04	2344	Jul 26	12:40:59	859	4261	T	pp	0.2752	2.3711	1.3351	353.2	220.7	83.8

35	-03	2362	Aug 06	19:27:11	920	4484	T+	pp	0.1948	2.5207	1.4807	357.5	225.7	94.9
36	-02	2380	Aug 17	02:16:10	983	4707	T+	pp	0.1172	2.6655	1.6209	360.8	229.1	101.5
37	-01	2398	Aug 28	09:06:27	1049	4930	T+	pp	0.0414	2.8069	1.7575	363.3	230.9	104.6
38	00	2416	Sep 07	16:02:33	1117	5153	T-	pp	-0.0288	2.8326	1.7780	364.9	231.5	104.9
39	01	2434	Sep 18	23:02:35	1186	5376	T-	pp	-0.0951	2.7137	1.6538	365.8	230.9	102.8
40	02	2452	Sep 29	06:10:28	1258	5599	T-	pp	-0.1542	2.6079	1.5426	366.2	229.6	98.7
41	03	2470	Oct 10	13:23:39	1332	5822	T-	pp	-0.2084	2.5113	1.4405	366.2	227.5	93.0
42	04	2488	Oct 20	20:46:19	1408	6045	T-	-p	-0.2544	2.4297	1.3535	365.9	225.2	86.4
43	05	2506	Nov 02	04:15:24	1486	6268	T	-p	-0.2945	2.3586	1.2773	365.6	222.8	78.8
44	06	2524	Nov 12	11:52:58	1566	6491	T	-p	-0.3270	2.3013	1.2152	365.2	220.4	71.0
45	07	2542	Nov 23	19:37:00	1648	6714	T	-t	-0.3540	2.2542	1.1635	364.9	218.3	63.1
46	08	2560	Dec 04	03:28:39	1732	6937	T	-t	-0.3739	2.2195	1.1250	364.8	216.6	55.9
47	09	2578	Dec 15	11:24:39	1818	7160	T	-t	-0.3903	2.1911	1.0933	364.7	215.1	48.8
48	10	2596	Dec 25	19:24:44	1907	7383	T	-t	-0.4030	2.1691	1.0688	364.6	213.9	42.3
49	11	2615	Jan 07	03:27:06	1997	7606	T	-t	-0.4133	2.1512	1.0490	364.6	213.0	36.0
50	12	2633	Jan 17	11:31:11	2089	7829	T	-t	-0.4215	2.1367	1.0334	364.5	212.2	29.9
51	13	2651	Jan 28	19:32:59	2184	8052	T	-t	-0.4314	2.1186	1.0151	364.1	211.2	20.2
52	14	2669	Feb 08	03:33:04	2281	8275	P	-t	-0.4424	2.0982	0.9951	363.5	210.0	-
53	15	2687	Feb 19	11:28:02	2379	8498	P	-t	-0.4574	2.0701	0.9682	362.5	208.3	-
54	16	2705	Mar 02	19:18:45	2480	8721	P	-t	-0.4756	2.0358	0.9357	361.1	206.2	-
55	17	2723	Mar 14	03:00:48	2583	8944	P	-t	-0.5004	1.9890	0.8913	358.9	202.9	-
56	18	2741	Mar 24	10:36:55	2688	9167	P	-t	-0.5301	1.9330	0.8383	356.2	198.7	-
57	19	2759	Apr 04	18:03:23	2795	9390	P	-t	-0.5676	1.8626	0.7710	352.5	192.9	-
58	20	2777	Apr 15	01:22:23	2904	9613	P	-t	-0.6112	1.7808	0.6927	347.8	185.3	-
59	21	2795	Apr 26	08:31:28	3015	9836	P	-t	-0.6630	1.6840	0.5996	341.7	175.0	-
60	22	2813	May 06	15:33:47	3128	10059	P	-t	-0.7203	1.5769	0.4963	334.4	161.9	-
61	23	2831	May 17	22:27:44	3243	10282	P	-t	-0.7844	1.4574	0.3804	325.5	144.2	-
62	24	2849	May 28	05:14:53	3361	10505	P	-t	-0.8542	1.3276	0.2543	314.7	120.0	-

												PHASE	
												DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													

01	-33	1832 Aug 11 14:14:52	6	-2071	Nb	t-	-1.5396	0.0662	-1.0000	79.1	-	-
02	-32	1850 Aug 22 20:54:59	7	-1848	N	t-	-1.4679	0.1997	-0.8704	136.1	-	-
03	-31	1868 Sep 02 03:41:27	2	-1625	N	t-	-1.4012	0.3242	-0.7499	171.9	-	-
04	-30	1886 Sep 13 10:34:41	-6	-1402	N	t-	-1.3398	0.4390	-0.6392	198.4	-	-
05	-29	1904 Sep 24 17:34:44	3	-1179	N	t-	-1.2837	0.5440	-0.5384	219.1	-	-
06	-28	1922 Oct 06 00:43:50	23	-956	N	t-	-1.2348	0.6358	-0.4508	235.2	-	-
07	-27	1940 Oct 16 08:01:17	25	-733	N	t-	-1.1924	0.7156	-0.3749	248.0	-	-
08	-26	1958 Oct 27 15:27:50	33	-510	N	t-	-1.1570	0.7825	-0.3118	257.9	-	-
09	-25	1976 Nov 06 23:01:59	47	-287	N	t-	-1.1275	0.8383	-0.2594	265.8	-	-
10	-24	1994 Nov 18 06:44:54	61	-64	N	t-	-1.1047	0.8815	-0.2189	271.6	-	-
11	-23	2012 Nov 28 14:34:07	68	159	N	t-	-1.0869	0.9155	-0.1873	276.0	-	-
12	-22	2030 Dec 09 22:28:51	78	382	N	t-	-1.0731	0.9416	-0.1628	279.2	-	-
13	-21	2048 Dec 20 06:27:48	92	605	N	t-	-1.0624	0.9617	-0.1436	281.6	-	-
14	-20	2066 Dec 31 14:30:10	128	828	N	t-	-1.0539	0.9773	-0.1281	283.3	-	-
15	-19	2085 Jan 10 22:32:29	168	1051	N	t-	-1.0453	0.9927	-0.1119	284.9	-	-
16	-18	2103 Jan 23 06:34:00	210	1274	Nx	t-	-1.0357	1.0095	-0.0937	286.5	-	-
17	-17	2121 Feb 02 14:32:40	253	1497	Nx	t-	-1.0235	1.0308	-0.0701	288.4	-	-
18	-16	2139 Feb 13 22:28:17	299	1720	Nx	t-	-1.0082	1.0574	-0.0406	290.8	-	-
19	-15	2157 Feb 24 06:16:36	343	1943	P	t-	-0.9868	1.0949	0.0005	294.2	5.6	-
20	-14	2175 Mar 07 13:59:53	383	2166	P	t-	-0.9608	1.1406	0.0502	298.1	54.8	-
21	-13	2193 Mar 17 21:34:32	425	2389	P	t-	-0.9274	1.1995	0.1138	303.0	81.6	-
22	-12	2211 Mar 30 05:02:58	469	2612	P	t-	-0.8882	1.2689	0.1880	308.4	103.6	-
23	-11	2229 Apr 09 12:21:26	515	2835	P	t-	-0.8403	1.3543	0.2786	314.6	124.2	-
24	-10	2247 Apr 20 19:34:24	563	3058	P	t-	-0.7870	1.4495	0.3789	320.9	142.4	-
25	-09	2265 May 01 02:38:34	613	3281	P	t-	-0.7260	1.5587	0.4934	327.4	159.3	-
26	-08	2283 May 12 09:37:20	666	3504	P	t-	-0.6596	1.6779	0.6177	333.7	174.4	-
27	-07	2301 May 23 16:29:16	720	3727	P	t-	-0.5869	1.8089	0.7536	339.6	187.8	-
28	-06	2319 Jun 03 23:18:19	776	3950	P	t-	-0.5109	1.9459	0.8953	344.8	199.2	-

29	-05	2337	Jun 14	06:03:17	835	4173	T	t-	-0.4307	2.0911	1.0448	349.2	208.8	34.0
30	-04	2355	Jun 25	12:46:19	895	4396	T	t-	-0.3479	2.2409	1.1986	352.7	216.4	68.0
31	-03	2373	Jul 05	19:28:57	958	4619	T-	t-	-0.2642	2.3928	1.3540	355.1	222.1	85.7
32	-02	2391	Jul 17	02:12:50	1023	4842	T-	pp	-0.1807	2.5444	1.5086	356.4	225.9	96.3
33	-01	2409	Jul 27	08:59:05	1090	5065	T-	pp	-0.0983	2.6943	1.6613	356.7	227.9	102.2
34	00	2427	Aug 07	15:48:57	1158	5288	T-	pp	-0.0180	2.8405	1.8096	356.0	228.3	104.4
35	01	2445	Aug 17	22:44:46	1229	5511	T+	pp	0.0583	2.7658	1.7366	354.5	227.3	103.3
36	02	2463	Aug 29	05:47:14	1302	5734	T+	pp	0.1296	2.6342	1.6063	352.2	225.1	99.7
37	03	2481	Sep 08	12:56:08	1377	5957	T+	pp	0.1966	2.5108	1.4839	349.4	221.9	93.7
38	04	2499	Sep 19	20:14:17	1455	6180	T+	pp	0.2568	2.4000	1.3737	346.3	218.1	85.8
39	05	2517	Oct 01	03:41:07	1534	6403	T	-p	0.3108	2.3007	1.2749	342.9	213.9	76.0
40	06	2535	Oct 12	11:18:38	1615	6626	T	-p	0.3567	2.2164	1.1908	339.5	209.6	65.0
41	07	2553	Oct 22	19:04:11	1698	6849	T	-p	0.3969	2.1426	1.1172	336.2	205.3	52.0
42	08	2571	Nov 03	03:01:01	1784	7072	T	-p	0.4285	2.0843	1.0591	333.2	201.5	37.5
43	09	2589	Nov 13	11:06:01	1871	7295	T	-p	0.4544	2.0367	1.0118	330.5	198.1	16.9
44	10	2607	Nov 25	19:20:19	1961	7518	P	-p	0.4734	2.0015	0.9772	328.1	195.4	-
45	11	2625	Dec 06	03:40:53	2053	7741	P	-p	0.4880	1.9745	0.9509	326.1	193.1	-
46	12	2643	Dec 17	12:08:59	2146	7964	P	-a	0.4971	1.9570	0.9347	324.3	191.5	-
47	13	2661	Dec 27	20:41:10	2242	8187	P	-a	0.5035	1.9444	0.9238	322.8	190.2	-
48	14	2680	Jan 08	05:16:52	2340	8410	P	-a	0.5078	1.9354	0.9170	321.3	189.2	-
49	15	2698	Jan 18	13:54:16	2440	8633	P	-a	0.5115	1.9274	0.9116	319.9	188.4	-
50	16	2716	Jan 30	22:32:36	2542	8856	P	-a	0.5151	1.9192	0.9066	318.4	187.6	-
51	17	2734	Feb 10	07:08:47	2646	9079	P	-a	0.5210	1.9064	0.8976	316.8	186.5	-
52	18	2752	Feb 21	15:42:15	2752	9302	P	-a	0.5298	1.8881	0.8835	314.9	185.0	-
53	19	2770	Mar 04	00:11:40	2860	9525	P	-a	0.5427	1.8620	0.8621	312.6	183.0	-
54	20	2788	Mar 14	08:36:50	2971	9748	P	-a	0.5601	1.8278	0.8327	309.9	180.4	-
55	21	2806	Mar 25	16:54:41	3083	9971	P	-a	0.5840	1.7812	0.7913	306.6	176.7	-
56	22	2824	Apr 05	01:07:10	3198	10194	P	-a	0.6129	1.7255	0.7408	302.8	172.1	-

57	23	2842	Apr 16	09:12:05	3314	10417	P	-a	0.6487	1.6572	0.6778	298.1	166.0	-
58	24	2860	Apr 26	17:11:09	3433	10640	P	-a	0.6900	1.5789	0.6047	292.8	158.3	-
59	25	2878	May 08	01:02:06	3553	10863	P	-a	0.7386	1.4872	0.5180	286.3	148.2	-
60	26	2896	May 18	08:48:25	3676	11086	P	-a	0.7915	1.3877	0.4233	278.9	135.6	-
61	27	2914	May 30	16:28:18	3801	11309	P	-a	0.8499	1.2784	0.3183	270.2	119.2	-
62	28	2932	Jun 10	00:03:59	3928	11532	P	-a	0.9122	1.1620	0.2058	260.3	97.2	-
63	29	2950	Jun 21	07:35:21	4057	11755	P	-a	0.9784	1.0389	0.0860	248.8	63.8	-
64	30	2968	Jul 01	15:04:44	4188	11978	N	-a	1.0464	0.9127	-0.0374	235.8	-	-
65	31	2986	Jul 12	22:32:25	4321	12201	N	-a	1.1162	0.7836	-0.1643	221.0	-	-
66	32	3004	Jul 24	05:59:11	4456	12424	N	-a	1.1868	0.6531	-0.2931	204.0	-	-
67	33	3022	Aug 04	13:27:37	4593	12647	N	-a	1.2562	0.5254	-0.4200	185.0	-	-
68	34	3040	Aug 14	20:57:38	4732	12870	N	-a	1.3243	0.4001	-0.5449	163.2	-	-
69	35	3058	Aug 26	04:31:35	4874	13093	N	-a	1.3896	0.2804	-0.6648	138.1	-	-
70	36	3076	Sep 05	12:08:52	5017	13316	N	-a	1.4523	0.1659	-0.7802	107.2	-	-
71	37	3094	Sep 16	19:52:41	5163	13539	Ne	-a	1.5099	0.0608	-0.8867	65.5	-	-

SAROS SERIES

146

Saros series 146 contains 72 lunar eclipses.

PHASE													
DURATIONS													
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-36	1843 Jul 11 16:49:54	6	-1936	Nb h-	1.5468	0.0226	-0.9831	43.3	-	-		
02	-35	1861 Jul 21 23:50:38	8	-1713	N a-	1.4659	0.1695	-0.8334	116.6	-	-		
03	-34	1879 Aug 02 06:57:44	-5	-1490	N a-	1.3889	0.3098	-0.6909	155.0	-	-		
04	-33	1897 Aug 12 14:08:38	-5	-1267	N a-	1.3135	0.4472	-0.5517	183.2	-	-		
05	-32	1915 Aug 24 21:27:17	18	-1044	N a-	1.2435	0.5750	-0.4226	204.4	-	-		
06	-31	1933 Sep 04 04:52:20	24	-821	N a-	1.1776	0.6955	-0.3013	221.4	-	-		
07	-30	1951 Sep 15 12:27:06	30	-598	N a-	1.1186	0.8034	-0.1928	234.6	-	-		
08	-29	1969 Sep 25 20:10:19	40	-375	N a-	1.0655	0.9007	-0.0953	245.1	-	-		
09	-28	1987 Oct 07 04:02:30	56	-152	N a-	1.0189	0.9863	-0.0096	253.5	-	-		
10	-27	2005 Oct 17 12:04:27	65	71	P a-	0.9796	1.0585	0.0625	259.8	56.0	-		
11	-26	2023 Oct 28 20:15:18	74	294	P a-	0.9471	1.1181	0.1220	264.6	77.4	-		
12	-25	2041 Nov 08 04:35:05	86	517	P a-	0.9212	1.1656	0.1696	268.0	90.3	-		
13	-24	2059 Nov 19 13:01:36	113	740	P a-	0.9004	1.2037	0.2079	270.5	99.2	-		
14	-23	2077 Nov 29 21:35:53	152	963	P a-	0.8854	1.2309	0.2356	272.0	105.0	-		
15	-22	2095 Dec 11 06:15:02	193	1186	P a-	0.8742	1.2510	0.2565	272.9	108.9	-		
16	-21	2113 Dec 22 14:58:42	236	1409	P a-	0.8666	1.2644	0.2712	273.2	111.5	-		
17	-20	2132 Jan 02 23:44:22	281	1632	P a-	0.8604	1.2750	0.2835	273.4	113.6	-		
18	-19	2150 Jan 13 08:31:35	328	1855	P a-	0.8552	1.2834	0.2941	273.3	115.3	-		
19	-18	2168 Jan 24 17:17:30	367	2078	P a-	0.8487	1.2940	0.3073	273.4	117.4	-		
20	-17	2186 Feb 04 02:01:15	408	2301	P a-	0.8402	1.3080	0.3244	273.7	120.1	-		

21	-16	2204	Feb 16	10:41:26	451	2524	P	a-	0.8285	1.3276	0.3475	274.5	123.7	-
22	-15	2222	Feb 26	19:17:36	497	2747	P	a-	0.8137	1.3530	0.3767	275.6	128.0	-
23	-14	2240	Mar 09	03:46:50	544	2970	P	a-	0.7925	1.3898	0.4175	277.4	133.8	-
24	-13	2258	Mar 20	12:10:19	593	3193	P	a-	0.7663	1.4358	0.4676	279.8	140.3	-
25	-12	2276	Mar 30	20:26:06	645	3416	P	a-	0.7334	1.4941	0.5301	282.8	147.8	-
26	-11	2294	Apr 11	04:36:13	698	3639	P	a-	0.6956	1.5613	0.6014	286.1	155.5	-
27	-10	2312	Apr 22	12:37:09	754	3862	P	a-	0.6499	1.6433	0.6873	290.0	163.8	-
28	-09	2330	May 03	20:33:07	812	4085	P	a-	0.5998	1.7334	0.7810	293.9	171.8	-
29	-08	2348	May 14	04:21:14	871	4308	P	a-	0.5425	1.8368	0.8878	298.0	179.7	-
30	-07	2366	May 25	12:05:08	933	4531	T	a-	0.4817	1.9469	1.0007	302.0	186.9	3.9
31	-06	2384	Jun 04	19:42:06	997	4754	T	a-	0.4149	2.0683	1.1244	305.7	193.6	50.8
32	-05	2402	Jun 16	03:16:59	1063	4977	T	p-	0.3462	2.1934	1.2513	309.1	199.2	69.4
33	-04	2420	Jun 26	10:47:40	1131	5200	T	p-	0.2737	2.3259	1.3849	311.9	203.9	82.0
34	-03	2438	Jul 07	18:17:19	1201	5423	T+	p-	0.2003	2.4604	1.5199	314.2	207.5	90.5
35	-02	2456	Jul 18	01:45:42	1273	5646	T+	p-	0.1257	2.5973	1.6567	315.9	210.0	96.1
36	-01	2474	Jul 29	09:15:38	1348	5869	T+	pp	0.0523	2.7323	1.7910	316.9	211.3	98.9
37	00	2492	Aug 08	16:47:17	1424	6092	T-	pp	-0.0195	2.7933	1.8505	317.3	211.6	99.4
38	01	2510	Aug 21	00:21:36	1502	6315	T-	pp	-0.0891	2.6666	1.7219	317.2	210.9	97.7
39	02	2528	Aug 31	08:00:19	1583	6538	T-	p-	-0.1549	2.5471	1.5999	316.6	209.3	94.1
40	03	2546	Sep 11	15:43:56	1665	6761	T-	p-	-0.2167	2.4353	1.4850	315.6	207.1	88.7
41	04	2564	Sep 21	23:33:16	1750	6984	T	p-	-0.2732	2.3332	1.3795	314.4	204.3	81.6
42	05	2582	Oct 03	07:29:03	1837	7207	T	p-	-0.3243	2.2415	1.2839	313.0	201.2	73.0
43	06	2600	Oct 14	15:31:59	1925	7430	T	p-	-0.3690	2.1614	1.1998	311.6	197.9	63.0
44	07	2618	Oct 25	23:42:26	2016	7653	T	-a	-0.4073	2.0934	1.1276	310.4	194.8	51.5
45	08	2636	Nov 05	07:58:56	2109	7876	T	-a	-0.4402	2.0352	1.0651	309.3	191.8	37.5
46	09	2654	Nov 16	16:23:11	2204	8099	T	-a	-0.4662	1.9896	1.0153	308.6	189.2	18.5
47	10	2672	Nov 27	00:53:08	2301	8322	P	-a	-0.4868	1.9539	0.9755	308.1	187.1	-
48	11	2690	Dec 08	09:29:22	2400	8545	P	-a	-0.5021	1.9276	0.9455	307.9	185.5	-

49	12	2708	Dec 19	18:08:42	2502	8768	P	-a	-0.5144	1.9069	0.9212	307.9	184.2	-
50	13	2726	Dec 31	02:52:31	2605	8991	P	-a	-0.5225	1.8935	0.9048	308.2	183.4	-
51	14	2745	Jan 10	11:37:38	2710	9214	P	-a	-0.5292	1.8826	0.8912	308.6	182.8	-
52	15	2763	Jan 21	20:23:35	2817	9437	P	-a	-0.5347	1.8736	0.8801	309.0	182.3	-
53	16	2781	Feb 01	05:07:58	2927	9660	P	-a	-0.5411	1.8627	0.8674	309.4	181.8	-
54	17	2799	Feb 12	13:50:02	3039	9883	P	-a	-0.5492	1.8484	0.8520	309.6	181.1	-
55	18	2817	Feb 22	22:27:41	3152	10106	P	-a	-0.5604	1.8283	0.8309	309.5	179.9	-
56	19	2835	Mar 06	06:59:29	3268	10329	P	-a	-0.5761	1.7998	0.8019	309.0	178.1	-
57	20	2853	Mar 16	15:24:48	3386	10552	P	-a	-0.5965	1.7624	0.7643	308.1	175.4	-
58	21	2871	Mar 27	23:42:41	3505	10775	P	-a	-0.6226	1.7147	0.7165	306.6	171.7	-
59	22	2889	Apr 07	07:51:21	3627	10998	P	-a	-0.6557	1.6538	0.6556	304.2	166.4	-
60	23	2907	Apr 19	15:51:24	3751	11221	P	-a	-0.6955	1.5808	0.5826	301.0	159.1	-
61	24	2925	Apr 29	23:42:01	3877	11444	P	-a	-0.7423	1.4951	0.4967	296.6	149.4	-
62	25	2943	May 11	07:24:37	4006	11667	P	-a	-0.7949	1.3987	0.4000	291.1	136.5	-
63	26	2961	May 21	14:56:55	4136	11890	P	-a	-0.8551	1.2886	0.2893	283.9	118.4	-
64	27	2979	Jun 01	22:22:35	4268	12113	P	-a	-0.9200	1.1699	0.1697	275.1	92.5	-
65	28	2997	Jun 12	05:40:06	4402	12336	P	-a	-0.9909	1.0405	0.0389	264.0	45.2	-
66	29	3015	Jun 24	12:52:15	4539	12559	N	-a	-1.0651	0.9053	-0.0982	250.8	-	-
67	30	3033	Jul 04	19:57:36	4677	12782	N	-h	-1.1438	0.7620	-0.2438	234.4	-	-
68	31	3051	Jul 16	03:00:27	4818	13005	N	-h	-1.2235	0.6172	-0.3914	214.9	-	-
69	32	3069	Jul 26	09:59:54	4960	13228	N	-h	-1.3051	0.4692	-0.5428	190.8	-	-
70	33	3087	Aug 06	16:58:01	5105	13451	N	-h	-1.3866	0.3215	-0.6943	160.9	-	-
71	34	3105	Aug 17	23:56:01	5252	13674	N	-h	-1.4671	0.1762	-0.8440	121.2	-	-
72	35	3123	Aug 29	06:55:44	5401	13897	Ne	-h	-1.5449	0.0358	-0.9891	55.5	-	-

SAROS SERIES

147

Saros series 147 contains 70 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-36	1890 Jul 02 14:08:36	-6	-1355	N	a-	-1.4871	0.1025	-0.8445	85.3	-	-		
02	-35	1908 Jul 13 21:33:55	8	-1132	N	a-	-1.4185	0.2292	-0.7195	126.3	-	-		
03	-34	1926 Jul 25 05:00:12	24	-909	N	a-	-1.3511	0.3542	-0.5970	155.5	-	-		
04	-33	1944 Aug 04 12:26:51	27	-686	N	a-	-1.2842	0.4785	-0.4758	179.1	-	-		
05	-32	1962 Aug 15 19:57:30	34	-463	N	a-	-1.2210	0.5963	-0.3616	198.2	-	-		
06	-31	1980 Aug 26 03:31:20	51	-240	N	a-	-1.1608	0.7089	-0.2531	214.4	-	-		
07	-30	1998 Sep 06 11:11:11	63	-17	N	a-	-1.1057	0.8121	-0.1544	227.8	-	-		
08	-29	2016 Sep 16 18:55:27	70	206	N	a-	-1.0548	0.9080	-0.0635	239.3	-	-		
09	-28	2034 Sep 28 02:47:37	81	429	P	a-	-1.0110	0.9911	0.0144	248.7	26.7	-		
10	-27	2052 Oct 08 10:45:58	99	652	P	a-	-0.9726	1.0642	0.0821	256.6	63.3	-		
11	-26	2070 Oct 19 18:51:12	137	875	P	a-	-0.9406	1.1258	0.1383	263.2	81.7	-		
12	-25	2088 Oct 30 03:03:20	177	1098	P	a-	-0.9147	1.1761	0.1831	268.5	93.6	-		
13	-24	2106 Nov 11 11:22:14	219	1321	P	a-	-0.8947	1.2153	0.2171	272.8	101.7	-		

14	-23	2124	Nov 21	19:47:21	263	1544	P	a-	-0.8808	1.2434	0.2401	276.1	106.9	-
15	-22	2142	Dec 03	04:16:11	309	1767	P	a-	-0.8704	1.2648	0.2569	278.9	110.6	-
16	-21	2160	Dec 13	12:50:19	351	1990	P	a-	-0.8650	1.2768	0.2646	280.8	112.4	-
17	-20	2178	Dec 24	21:26:20	392	2213	P	a-	-0.8614	1.2853	0.2694	282.5	113.6	-
18	-19	2197	Jan 04	06:04:04	434	2436	P	a-	-0.8601	1.2894	0.2703	283.8	114.1	-
19	-18	2215	Jan 16	14:40:00	479	2659	P	a-	-0.8578	1.2950	0.2732	285.2	115.0	-
20	-17	2233	Jan 26	23:15:04	525	2882	P	a-	-0.8553	1.3006	0.2767	286.6	116.0	-
21	-16	2251	Feb 07	07:45:40	574	3105	P	a-	-0.8497	1.3117	0.2862	288.4	118.1	-
22	-15	2269	Feb 17	16:11:18	624	3328	P	a-	-0.8406	1.3289	0.3023	290.7	121.5	-
23	-14	2287	Mar 01	00:30:02	677	3551	P	a-	-0.8265	1.3553	0.3278	293.6	126.4	-
24	-13	2305	Mar 12	08:41:35	732	3774	P	a-	-0.8072	1.3909	0.3629	297.2	132.7	-
25	-12	2323	Mar 23	16:43:41	789	3997	P	h-	-0.7809	1.4392	0.4110	301.6	140.6	-
26	-11	2341	Apr 03	00:36:59	848	4220	P	h-	-0.7480	1.4997	0.4713	306.6	149.6	-
27	-10	2359	Apr 14	08:20:06	909	4443	P	t-	-0.7077	1.5737	0.5452	312.4	159.6	-
28	-09	2377	Apr 24	15:54:42	972	4666	P	t-	-0.6611	1.6595	0.6307	318.5	169.8	-
29	-08	2395	May 05	23:17:48	1037	4889	P	t-	-0.6059	1.7608	0.7316	325.0	180.5	-
30	-07	2413	May 16	06:33:36	1104	5112	P	t-	-0.5457	1.8718	0.8419	331.5	190.5	-
31	-06	2431	May 27	13:39:33	1173	5335	P	t-	-0.4783	1.9959	0.9651	338.0	200.2	-
32	-05	2449	Jun 06	20:40:00	1245	5558	T	t-	-0.4068	2.1278	1.0956	344.0	208.7	48.3
33	-04	2467	Jun 18	03:31:37	1318	5781	T	p-	-0.3290	2.2713	1.2374	349.5	216.3	72.8
34	-03	2485	Jun 28	10:20:45	1394	6004	T-	pp	-0.2499	2.4177	1.3816	354.2	222.4	87.8
35	-02	2503	Jul 10	17:04:26	1471	6227	T-	pp	-0.1673	2.5705	1.5317	358.1	227.0	97.7
36	-01	2521	Jul 20	23:47:33	1551	6450	T-	pp	-0.0849	2.7232	1.6814	361.1	229.9	103.3
37	00	2539	Aug 01	06:28:18	1633	6673	T-	pp	-0.0012	2.8786	1.8333	363.0	231.3	105.3
38	01	2557	Aug 11	13:11:57	1716	6896	T+	pp	0.0794	2.7370	1.6879	363.9	231.1	103.8
39	02	2575	Aug 22	19:56:32	1802	7119	T+	pp	0.1584	2.5943	1.5408	364.0	229.3	98.8
40	03	2593	Sep 02	02:44:50	1890	7342	T+	pp	0.2335	2.4587	1.4006	363.2	226.2	90.3
41	04	2611	Sep 14	09:37:36	1980	7565	T	-t	0.3042	2.3315	1.2685	361.7	221.9	77.8

42	05	2629	Sep 24	16:36:45	2072	7788	T	-t	0.3690	2.2151	1.1472	359.7	216.7	60.2
43	06	2647	Oct 05	23:42:33	2166	8011	T	-t	0.4277	2.1100	1.0370	357.4	210.9	31.3
44	07	2665	Oct 16	06:55:19	2263	8234	P	-t	0.4800	2.0165	0.9385	354.9	204.7	-
45	08	2683	Oct 27	14:16:32	2361	8457	P	-t	0.5247	1.9369	0.8540	352.5	198.6	-
46	09	2701	Nov 07	21:45:22	2461	8680	P	-t	0.5629	1.8693	0.7818	350.3	192.7	-
47	10	2719	Nov 19	05:21:16	2564	8903	P	-t	0.5947	1.8131	0.7212	348.3	187.3	-
48	11	2737	Nov 29	13:04:48	2668	9126	P	-t	0.6201	1.7684	0.6727	346.6	182.6	-
49	12	2755	Dec 10	20:54:39	2775	9349	P	-t	0.6402	1.7333	0.6342	345.3	178.6	-
50	13	2773	Dec 21	04:50:12	2884	9572	P	-t	0.6553	1.7068	0.6051	344.3	175.4	-
51	14	2792	Jan 01	12:48:24	2994	9795	P	-t	0.6682	1.6842	0.5804	343.4	172.6	-
52	15	2810	Jan 11	20:50:27	3107	10018	P	-t	0.6779	1.6669	0.5620	342.6	170.5	-
53	16	2828	Jan 23	04:52:44	3222	10241	P	-t	0.6877	1.6493	0.5439	341.7	168.3	-
54	17	2846	Feb 02	12:54:05	3339	10464	P	-t	0.6979	1.6303	0.5253	340.5	165.9	-
55	18	2864	Feb 13	20:52:07	3458	10687	P	-t	0.7108	1.6061	0.5022	338.9	162.8	-
56	19	2882	Feb 24	04:46:33	3579	10910	P	-t	0.7267	1.5761	0.4740	336.8	158.9	-
57	20	2900	Mar 07	12:35:27	3702	11133	P	-t	0.7471	1.5374	0.4377	333.9	153.6	-
58	21	2918	Mar 18	20:16:49	3827	11356	P	-t	0.7735	1.4874	0.3907	330.0	146.1	-
59	22	2936	Mar 29	03:51:11	3955	11579	P	-t	0.8056	1.4267	0.3334	325.0	136.1	-
60	23	2954	Apr 09	11:16:53	4084	11802	P	-t	0.8444	1.3536	0.2641	318.7	122.3	-
61	24	2972	Apr 19	18:34:31	4216	12025	P	-t	0.8899	1.2681	0.1826	310.8	102.9	-
62	25	2990	May 01	01:43:20	4349	12248	P	-t	0.9427	1.1692	0.0880	301.1	72.3	-
63	26	3008	May 12	08:44:58	4485	12471	Nx	-t	1.0011	1.0598	-0.0173	289.4	-	-
64	27	3026	May 23	15:39:32	4622	12694	N	-t	1.0652	0.9401	-0.1328	275.4	-	-
65	28	3044	Jun 02	22:27:13	4762	12917	N	-t	1.1350	0.8101	-0.2588	258.4	-	-
66	29	3062	Jun 14	05:10:19	4904	13140	N	-t	1.2083	0.6737	-0.3914	238.3	-	-
67	30	3080	Jun 24	11:49:03	5048	13363	N	-t	1.2850	0.5311	-0.5305	213.9	-	-
68	31	3098	Jul 05	18:26:12	5194	13586	N	-t	1.3633	0.3858	-0.6726	184.3	-	-
69	32	3116	Jul 17	01:00:59	5342	13809	N	-t	1.4434	0.2375	-0.8182	146.2	-	-

SAROS SERIES

148

Saros series 148 contains 70 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-33	1973 Jul 15 11:39:19	44	-328	Nb	t-	1.5177	0.1046	-0.9581	99.1	-	-		
02	-32	1991 Jul 26 18:08:50	58	-105	N	t-	1.4369	0.2542	-0.8110	152.7	-	-		
03	-31	2009 Aug 06 00:40:18	66	118	N	t-	1.3572	0.4019	-0.6661	189.8	-	-		
04	-30	2027 Aug 17 07:14:59	76	341	N	t-	1.2797	0.5456	-0.5254	218.6	-	-		
05	-29	2045 Aug 27 13:54:50	89	564	N	t-	1.2060	0.6825	-0.3919	241.7	-	-		
06	-28	2063 Sep 07 20:41:12	121	787	N	t-	1.1374	0.8101	-0.2678	260.4	-	-		
07	-27	2081 Sep 18 03:35:26	161	1010	N	t-	1.0747	0.9270	-0.1545	275.7	-	-		
08	-26	2099 Sep 29 10:36:38	202	1233	Nx	t-	1.0174	1.0340	-0.0512	288.3	-	-		

09	-25	2117	Oct 10	17:47:12	245	1456	P	t-	0.9675	1.1274	0.0387	298.5	48.4	-
10	-24	2135	Oct 22	01:06:05	291	1679	P	t-	0.9242	1.2085	0.1164	306.6	83.1	-
11	-23	2153	Nov 01	08:34:03	336	1902	P	t-	0.8881	1.2763	0.1811	313.0	102.7	-
12	-22	2171	Nov 12	16:10:02	376	2125	P	t-	0.8584	1.3323	0.2343	318.0	115.9	-
13	-21	2189	Nov 22	23:54:08	417	2348	P	t-	0.8349	1.3765	0.2764	321.7	125.0	-
14	-20	2207	Dec 05	07:45:24	461	2571	P	t-	0.8170	1.4102	0.3084	324.3	131.4	-
15	-19	2225	Dec 15	15:41:08	506	2794	P	t-	0.8026	1.4370	0.3343	326.2	136.2	-
16	-18	2243	Dec 26	23:42:17	554	3017	P	t-	0.7922	1.4562	0.3533	327.5	139.5	-
17	-17	2262	Jan 06	07:45:00	604	3240	P	t-	0.7832	1.4725	0.3702	328.3	142.2	-
18	-16	2280	Jan 17	15:49:31	656	3463	P	t-	0.7749	1.4871	0.3860	329.0	144.8	-
19	-15	2298	Jan 27	23:51:16	710	3686	P	t-	0.7640	1.5060	0.4070	329.8	148.0	-
20	-14	2316	Feb 09	07:52:24	766	3909	P	t-	0.7523	1.5260	0.4299	330.5	151.4	-
21	-13	2334	Feb 19	15:48:18	824	4132	P	t-	0.7362	1.5538	0.4612	331.6	155.8	-
22	-12	2352	Mar 01	23:39:18	884	4355	P	t-	0.7155	1.5898	0.5013	333.1	161.1	-
23	-11	2370	Mar 13	07:22:52	946	4578	P	t-	0.6883	1.6373	0.5534	335.2	167.6	-
24	-10	2388	Mar 23	15:00:16	1011	4801	P	t-	0.6554	1.6951	0.6163	337.6	174.8	-
25	-09	2406	Apr 03	22:29:30	1077	5024	P	t-	0.6153	1.7659	0.6924	340.4	182.5	-
26	-08	2424	Apr 14	05:51:07	1146	5247	P	t-	0.5686	1.8490	0.7810	343.5	190.6	-
27	-07	2442	Apr 25	13:05:12	1216	5470	P	t-	0.5147	1.9449	0.8825	346.6	198.5	-
28	-06	2460	May 05	20:13:03	1289	5693	P	t-	0.4550	2.0519	0.9949	349.6	206.0	-
29	-05	2478	May 17	03:13:38	1364	5916	T	t-	0.3883	2.1715	1.1200	352.4	212.9	54.3
30	-04	2496	May 27	10:09:53	1440	6139	T	t-	0.3172	2.2994	1.2530	354.6	218.7	75.2
31	-03	2514	Jun 08	17:01:23	1519	6362	T+	p-	0.2410	2.4366	1.3951	356.2	223.3	89.1
32	-02	2532	Jun 18	23:51:43	1600	6585	T+	pp	0.1630	2.5775	1.5405	356.9	226.5	97.9
33	-01	2550	Jun 30	06:38:43	1683	6808	T+	pp	0.0811	2.7258	1.6929	356.8	228.2	103.0
34	00	2568	Jul 10	13:27:45	1768	7031	T-	pp	-0.0002	2.8724	1.8432	355.8	228.4	104.5
35	01	2586	Jul 21	20:16:47	1855	7254	T-	pp	-0.0826	2.7194	1.6935	353.8	226.9	102.6
36	02	2604	Aug 02	03:10:29	1944	7477	T-	pp	-0.1619	2.5726	1.5493	351.0	224.1	97.5

37	03	2622	Aug 13	10:06:08	2036	7700	T-	pp	-0.2405	2.4273	1.4063	347.3	219.8	88.7
38	04	2640	Aug 23	17:09:19	2129	7923	T	-p	-0.3138	2.2918	1.2726	343.0	214.5	76.1
39	05	2658	Sep 04	00:17:32	2224	8146	T	-p	-0.3839	2.1626	1.1447	338.1	208.0	57.7
40	06	2676	Sep 14	07:34:06	2322	8369	T	-t	-0.4478	2.0448	1.0280	332.9	200.9	26.2
41	07	2694	Sep 25	14:58:03	2421	8592	P	-h	-0.5063	1.9370	0.9208	327.6	193.3	-
42	08	2712	Oct 06	22:32:13	2523	8815	P	-h	-0.5570	1.8438	0.8281	322.5	185.7	-
43	09	2730	Oct 18	06:15:28	2627	9038	P	-a	-0.6012	1.7626	0.7471	317.5	178.3	-
44	10	2748	Oct 28	14:07:40	2733	9261	P	-a	-0.6389	1.6934	0.6781	312.9	171.3	-
45	11	2766	Nov 08	22:09:29	2840	9484	P	-a	-0.6694	1.6373	0.6222	308.9	165.1	-
46	12	2784	Nov 19	06:20:13	2950	9707	P	-a	-0.6931	1.5936	0.5788	305.4	159.9	-
47	13	2802	Nov 30	14:39:15	3062	9930	P	-a	-0.7109	1.5606	0.5464	302.5	155.7	-
48	14	2820	Dec 10	23:05:01	3176	10153	P	-a	-0.7238	1.5367	0.5232	300.1	152.5	-
49	15	2838	Dec 22	07:37:16	3292	10376	P	-a	-0.7322	1.5205	0.5082	298.2	150.3	-
50	16	2857	Jan 01	16:14:14	3411	10599	P	-a	-0.7373	1.5104	0.4998	296.6	148.8	-
51	17	2875	Jan 13	00:53:41	3531	10822	P	-a	-0.7410	1.5026	0.4941	295.2	147.7	-
52	18	2893	Jan 23	09:34:59	3653	11045	P	-a	-0.7436	1.4964	0.4906	293.9	146.9	-
53	19	2911	Feb 04	18:15:58	3778	11268	P	-a	-0.7469	1.4888	0.4860	292.5	146.0	-
54	20	2929	Feb 15	02:55:11	3904	11491	P	-a	-0.7522	1.4773	0.4781	290.8	144.6	-
55	21	2947	Feb 26	11:30:31	4033	11714	P	-a	-0.7613	1.4586	0.4634	288.6	142.4	-
56	22	2965	Mar 08	20:02:09	4163	11937	P	-a	-0.7738	1.4335	0.4427	286.0	139.3	-
57	23	2983	Mar 20	04:28:31	4296	12160	P	-a	-0.7910	1.3995	0.4134	282.7	134.9	-
58	24	3001	Mar 31	12:47:55	4431	12383	P	-a	-0.8146	1.3538	0.3725	278.6	128.6	-
59	25	3019	Apr 11	21:01:06	4568	12606	P	-a	-0.8438	1.2977	0.3213	273.7	120.1	-
60	26	3037	Apr 22	05:07:11	4707	12829	P	-a	-0.8796	1.2296	0.2582	267.6	108.4	-
61	27	3055	May 03	13:07:16	4848	13052	P	-a	-0.9207	1.1517	0.1850	260.4	92.6	-
62	28	3073	May 13	20:59:30	4991	13275	P	-a	-0.9688	1.0612	0.0991	251.7	68.5	-
63	29	3091	May 25	04:47:08	5136	13498	P	-a	-1.0213	0.9627	0.0048	241.7	15.3	-
64	30	3109	Jun 05	12:28:40	5283	13721	N	-a	-1.0794	0.8541	-0.1000	229.6	-	-

65	31	3127	Jun 16	20:05:50	5432	13944	N	-a	-1.1415	0.7385	-0.2122	215.6	-	-
66	32	3145	Jun 27	03:38:46	5584	14167	N	-a	-1.2073	0.6164	-0.3315	199.0	-	-
67	33	3163	Jul 08	11:09:48	5737	14390	N	-a	-1.2749	0.4911	-0.4546	179.5	-	-
68	34	3181	Jul 18	18:39:22	5893	14613	N	-a	-1.3440	0.3635	-0.5805	156.1	-	-
69	35	3199	Jul 30	02:08:02	6050	14836	N	-a	-1.4140	0.2346	-0.7084	126.8	-	-
70	36	3217	Aug 09	09:38:06	6210	15059	N	-a	-1.4829	0.1079	-0.8347	86.9	-	-

SAROS SERIES

149

Saros series 149 contains 71 lunar eclipses.

													PHASE
													DURATIONS
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-35	1984 Jun 13	14:26:39	54	-193	Nb a-	-1.5239	0.0647	-0.9414	73.0	-	-	
02	-34	2002 Jun 24	21:28:13	64	30	N a-	-1.4439	0.2095	-0.7925	129.1	-	-	
03	-33	2020 Jul 05	04:31:12	72	253	N a-	-1.3638	0.3546	-0.6436	165.0	-	-	

04	-32	2038	Jul 16	11:35:56	84	476	N	a-	-1.2837	0.4999	-0.4952	192.4	-	-
05	-31	2056	Jul 26	18:43:24	106	699	N	a-	-1.2048	0.6435	-0.3489	214.4	-	-
06	-30	2074	Aug 07	01:56:03	145	922	N	a-	-1.1291	0.7813	-0.2091	232.2	-	-
07	-29	2092	Aug 17	09:13:59	185	1145	N	a-	-1.0568	0.9131	-0.0757	246.7	-	-
08	-28	2110	Aug 29	16:38:48	228	1368	P	a-	-0.9893	1.0365	0.0488	258.6	49.8	-
09	-27	2128	Sep 09	00:10:30	273	1591	P	a-	-0.9266	1.1513	0.1642	268.2	89.6	-
10	-26	2146	Sep 20	07:51:28	319	1814	P	a-	-0.8707	1.2537	0.2669	275.9	112.3	-
11	-25	2164	Sep 30	15:40:32	360	2037	P	a-	-0.8209	1.3449	0.3581	282.0	128.0	-
12	-24	2182	Oct 11	23:38:06	400	2260	P	a-	-0.7776	1.4246	0.4376	286.8	139.4	-
13	-23	2200	Oct 23	07:44:43	443	2483	P	a-	-0.7411	1.4917	0.5044	290.4	147.8	-
14	-22	2218	Nov 03	16:00:25	488	2706	P	a-	-0.7113	1.5465	0.5589	293.0	153.8	-
15	-21	2236	Nov 14	00:24:12	535	2929	P	a-	-0.6879	1.5896	0.6019	294.8	158.2	-
16	-20	2254	Nov 25	08:54:59	584	3152	P	a-	-0.6696	1.6231	0.6353	296.0	161.3	-
17	-19	2272	Dec 05	17:32:31	635	3375	P	a-	-0.6565	1.6470	0.6596	296.7	163.3	-
18	-18	2290	Dec 17	02:15:35	688	3598	P	a-	-0.6473	1.6636	0.6768	296.9	164.6	-
19	-17	2308	Dec 28	11:01:33	744	3821	P	a-	-0.6401	1.6763	0.6906	296.9	165.6	-
20	-16	2327	Jan 08	19:50:18	801	4044	P	a-	-0.6349	1.6851	0.7008	296.7	166.3	-
21	-15	2345	Jan 19	04:38:50	860	4267	P	a-	-0.6290	1.6948	0.7125	296.6	167.1	-
22	-14	2363	Jan 30	13:27:21	922	4490	P	a-	-0.6231	1.7045	0.7245	296.4	167.9	-
23	-13	2381	Feb 09	22:11:31	985	4713	P	a-	-0.6131	1.7214	0.7442	296.6	169.4	-
24	-12	2399	Feb 21	06:53:33	1051	4936	P	a-	-0.6013	1.7416	0.7675	297.0	171.1	-
25	-11	2417	Mar 03	15:29:02	1118	5159	P	a-	-0.5837	1.7721	0.8015	297.8	173.7	-
26	-10	2435	Mar 14	23:59:26	1188	5382	P	a-	-0.5619	1.8103	0.8434	298.9	176.7	-
27	-09	2453	Mar 25	08:21:32	1260	5605	P	a-	-0.5329	1.8615	0.8982	300.5	180.5	-
28	-08	2471	Apr 05	16:38:08	1334	5828	P	a-	-0.4993	1.9215	0.9619	302.4	184.6	-
29	-07	2489	Apr 16	00:46:37	1410	6051	T	a-	-0.4585	1.9945	1.0385	304.5	189.0	29.0
30	-06	2507	Apr 28	08:48:07	1488	6274	T	a-	-0.4117	2.0786	1.1261	306.8	193.6	51.0
31	-05	2525	May 08	16:42:30	1568	6497	T	p-	-0.3589	2.1739	1.2244	309.2	198.0	66.0

32	-04	2543	May 20	00:31:08	1650	6720	T	p-	-0.3011	2.2786	1.3317	311.4	202.1	77.5
33	-03	2561	May 30	08:13:38	1734	6943	T-	p-	-0.2381	2.3931	1.4485	313.5	205.7	86.4
34	-02	2579	Jun 10	15:51:26	1821	7166	T-	p-	-0.1708	2.5156	1.5728	315.2	208.5	92.9
35	-01	2597	Jun 20	23:25:26	1909	7389	T-	pp	-0.1005	2.6442	1.7025	316.4	210.5	97.3
36	00	2615	Jul 03	06:57:20	1999	7612	T-	pp	-0.0286	2.7759	1.8347	317.0	211.5	99.3
37	01	2633	Jul 13	14:26:23	2092	7835	T+	pp	0.0456	2.7446	1.8033	317.1	211.5	99.1
38	02	2651	Jul 24	21:56:01	2187	8058	T+	-p	0.1192	2.6099	1.6679	316.6	210.4	96.5
39	03	2669	Aug 04	05:25:20	2283	8281	T+	-p	0.1927	2.4758	1.5324	315.4	208.2	91.3
40	04	2687	Aug 15	12:57:37	2382	8504	T+	-p	0.2634	2.3470	1.4016	313.7	205.0	83.4
41	05	2705	Aug 26	20:31:01	2483	8727	T	-p	0.3328	2.2210	1.2731	311.5	200.7	72.0
42	06	2723	Sep 07	04:10:10	2586	8950	T	-a	0.3969	2.1050	1.1539	308.9	195.8	56.2
43	07	2741	Sep 17	11:52:55	2691	9173	T	-a	0.4576	1.9954	1.0408	306.0	190.2	29.9
44	08	2759	Sep 28	19:42:45	2798	9396	P	-a	0.5121	1.8973	0.9387	303.1	184.2	-
45	09	2777	Oct 09	03:37:45	2907	9619	P	-a	0.5620	1.8080	0.8451	300.2	177.9	-
46	10	2795	Oct 20	11:41:11	3018	9842	P	-a	0.6046	1.7321	0.7647	297.5	171.8	-
47	11	2813	Oct 30	19:50:33	3131	10065	P	-a	0.6418	1.6662	0.6941	295.1	165.9	-
48	12	2831	Nov 11	04:07:08	3246	10288	P	-a	0.6729	1.6115	0.6349	293.0	160.4	-
49	13	2849	Nov 21	12:30:21	3364	10511	P	-a	0.6981	1.5676	0.5864	291.4	155.7	-
50	14	2867	Dec 02	21:00:11	3483	10734	P	-a	0.7178	1.5335	0.5479	290.3	151.7	-
51	15	2885	Dec 13	05:35:06	3605	10957	P	-a	0.7328	1.5082	0.5185	289.7	148.5	-
52	16	2903	Dec 25	14:13:38	3728	11180	P	-a	0.7445	1.4885	0.4951	289.3	145.9	-
53	17	2922	Jan 04	22:55:38	3854	11403	P	-a	0.7529	1.4748	0.4781	289.4	144.1	-
54	18	2940	Jan 16	07:38:56	3982	11626	P	-a	0.7602	1.4627	0.4633	289.4	142.5	-
55	19	2958	Jan 26	16:21:51	4112	11849	P	-a	0.7672	1.4511	0.4493	289.5	140.9	-
56	20	2976	Feb 07	01:03:02	4244	12072	P	-a	0.7754	1.4370	0.4333	289.5	139.1	-
57	21	2994	Feb 17	09:41:01	4378	12295	P	-a	0.7857	1.4188	0.4137	289.1	136.7	-
58	22	3012	Feb 29	18:14:35	4514	12518	P	-a	0.7993	1.3944	0.3883	288.2	133.3	-
59	23	3030	Mar 12	02:41:30	4652	12741	P	-a	0.8179	1.3606	0.3538	286.6	128.2	-

60	24	3048	Mar 22	11:01:59	4792	12964	P	-a	0.8414	1.3176	0.3105	284.3	121.2	-
61	25	3066	Apr 02	19:14:15	4934	13187	P	-a	0.8711	1.2633	0.2559	280.9	111.2	-
62	26	3084	Apr 13	03:17:50	5078	13410	P	-a	0.9074	1.1967	0.1892	276.2	96.9	-
63	27	3102	Apr 25	11:12:11	5225	13633	P	-a	0.9506	1.1175	0.1098	270.1	74.9	-
64	28	3120	May 05	18:57:43	5373	13856	P	-a	1.0003	1.0264	0.0185	262.3	31.2	-
65	29	3138	May 17	02:34:46	5524	14079	N	-a	1.0563	0.9240	-0.0844	252.4	-	-
66	30	3156	May 27	10:01:55	5676	14302	N	-a	1.1193	0.8088	-0.2003	239.8	-	-
67	31	3174	Jun 07	17:21:58	5831	14525	N	-a	1.1869	0.6853	-0.3249	224.3	-	-
68	32	3192	Jun 18	00:33:55	5988	14748	N	-h	1.2599	0.5521	-0.4596	204.7	-	-
69	33	3210	Jun 29	07:40:41	6147	14971	N	-h	1.3360	0.4134	-0.6002	180.2	-	-
70	34	3228	Jul 09	14:40:47	6308	15194	N	-h	1.4163	0.2673	-0.7487	147.4	-	-
71	35	3246	Jul 20	21:38:34	6471	15417	N	-h	1.4970	0.1206	-0.8983	100.8	-	-

SAROS SERIES

150

Saros series 150 contains 71 lunar eclipses.

PHASE													
DURATIONS													
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL

NUM.	NUM.	DATE	OF	s	NUM	TYPE	MAG.	MAG.	m	m	m
GREATEST											
ECLIPSE											
01	-37	2013 May 25 04:11:06	68	165	Nb a-	1.5350 0.0157 -0.9335	33.6	-	-	-	-
02	-36	2031 Jun 05 11:45:17	78	388	N a-	1.4731 0.1292 -0.8199	95.6	-	-	-	-
03	-35	2049 Jun 15 19:14:12	92	611	N a-	1.4068 0.2511 -0.6985	132.0	-	-	-	-
04	-34	2067 Jun 27 02:41:06	129	834	N a-	1.3394 0.3754 -0.5753	159.8	-	-	-	-
05	-33	2085 Jul 07 10:04:40	169	1057	N a-	1.2694 0.5047 -0.4478	183.5	-	-	-	-
06	-32	2103 Jul 19 17:28:43	211	1280	N a-	1.2002 0.6328 -0.3220	203.4	-	-	-	-
07	-31	2121 Jul 30 00:52:44	255	1503	N a-	1.1312 0.7610 -0.1968	220.8	-	-	-	-
08	-30	2139 Aug 10 08:18:10	301	1726	N a-	1.0638 0.8865 -0.0749	236.0	-	-	-	-
09	-29	2157 Aug 20 15:46:36	344	1949	P a-	0.9992 1.0070 0.0415	249.2	45.1	-	-	-
10	-28	2175 Aug 31 23:19:04	384	2172	P a-	0.9385 1.1207 0.1506	260.6	84.8	-	-	-
11	-27	2193 Sep 11 06:57:00	426	2395	P a-	0.8828 1.2256 0.2505	270.4	108.1	-	-	-
12	-26	2211 Sep 23 14:39:33	470	2618	P a-	0.8314 1.3226 0.3421	278.9	124.9	-	-	-
13	-25	2229 Oct 03 22:29:31	516	2841	P a-	0.7865 1.4077 0.4216	286.0	137.4	-	-	-
14	-24	2247 Oct 15 06:25:30	565	3064	P a-	0.7471 1.4829 0.4911	292.2	147.1	-	-	-
15	-23	2265 Oct 25 14:28:59	615	3287	P a-	0.7146 1.5454 0.5480	297.3	154.4	-	-	-
16	-22	2283 Nov 05 22:38:43	667	3510	P a-	0.6877 1.5976 0.5945	301.6	160.1	-	-	-
17	-21	2301 Nov 17 06:56:02	722	3733	P a-	0.6678 1.6368 0.6283	305.1	164.1	-	-	-
18	-20	2319 Nov 28 15:18:35	778	3956	P a-	0.6528 1.6670 0.6533	308.0	167.1	-	-	-
19	-19	2337 Dec 08 23:45:53	837	4179	P a-	0.6423 1.6887 0.6702	310.4	169.2	-	-	-
20	-18	2355 Dec 20 08:16:43	897	4402	P a-	0.6355 1.7033 0.6805	312.4	170.6	-	-	-
21	-17	2373 Dec 30 16:50:27	960	4625	P a-	0.6322 1.7113 0.6848	314.0	171.5	-	-	-
22	-16	2392 Jan 11 01:23:56	1025	4848	P a-	0.6291 1.7186 0.6889	315.6	172.4	-	-	-
23	-15	2410 Jan 21 09:56:47	1091	5071	P a-	0.6263 1.7250 0.6926	317.0	173.2	-	-	-
24	-14	2428 Feb 01 18:26:27	1160	5294	P a-	0.6218 1.7344 0.6999	318.6	174.4	-	-	-
25	-13	2446 Feb 12 02:53:07	1231	5517	P a-	0.6155 1.7467 0.7106	320.3	175.9	-	-	-

26	-12	2464	Feb 23	11:12:18	1304	5740	P	a-	0.6041	1.7683	0.7311	322.4	178.3	-
27	-11	2482	Mar 05	19:26:14	1380	5963	P	a-	0.5889	1.7964	0.7585	324.9	181.3	-
28	-10	2500	Mar 17	03:30:27	1457	6186	P	h-	0.5665	1.8378	0.7996	327.9	185.4	-
29	-09	2518	Mar 28	11:27:42	1536	6409	P	t-	0.5390	1.8883	0.8498	331.2	190.1	-
30	-08	2536	Apr 07	19:13:18	1617	6632	P	t-	0.5027	1.9550	0.9165	335.1	195.6	-
31	-07	2554	Apr 19	02:51:33	1701	6855	P	t-	0.4610	2.0315	0.9929	339.2	201.4	-
32	-06	2572	Apr 29	10:18:28	1786	7078	T	p-	0.4106	2.1240	1.0853	343.6	207.5	45.6
33	-05	2590	May 10	17:36:56	1874	7301	T	p-	0.3540	2.2281	1.1891	347.9	213.5	65.8
34	-04	2608	May 22	00:45:18	1963	7524	T	pp	0.2896	2.3465	1.3069	352.1	219.1	80.7
35	-03	2626	Jun 02	07:46:44	2055	7747	T+	pp	0.2203	2.4741	1.4338	355.8	223.9	91.7
36	-02	2644	Jun 12	14:40:34	2149	7970	T+	pp	0.1454	2.6121	1.5705	359.0	227.7	99.4
37	-01	2662	Jun 23	21:28:04	2245	8193	T+	pp	0.0662	2.7583	1.7152	361.5	230.3	104.0
38	00	2680	Jul 04	04:11:07	2343	8416	T-	pp	-0.0161	2.8511	1.8060	363.0	231.3	105.3
39	01	2698	Jul 15	10:51:12	2443	8639	T-	pp	-0.1003	2.6979	1.6503	363.5	230.7	102.9
40	02	2716	Jul 26	17:28:56	2545	8862	T-	pp	-0.1855	2.5429	1.4926	363.0	228.4	96.4
41	03	2734	Aug 07	00:06:17	2649	9085	T-	-t	-0.2703	2.3889	1.3353	361.3	224.2	84.8
42	04	2752	Aug 17	06:45:06	2755	9308	T	-t	-0.3533	2.2385	1.1814	358.7	218.2	66.0
43	05	2770	Aug 28	13:27:15	2863	9531	T	-t	-0.4330	2.0943	1.0331	355.1	210.4	29.6
44	06	2788	Sep 07	20:12:11	2974	9754	P	-t	-0.5098	1.9554	0.8901	350.6	200.9	-
45	07	2806	Sep 19	03:03:31	3086	9977	P	-t	-0.5808	1.8275	0.7577	345.6	190.1	-
46	08	2824	Sep 29	10:00:55	3201	10200	P	-t	-0.6461	1.7100	0.6356	340.2	178.0	-
47	09	2842	Oct 10	17:06:32	3317	10423	P	-t	-0.7043	1.6054	0.5264	334.7	165.2	-
48	10	2860	Oct 21	00:18:17	3436	10646	P	-t	-0.7571	1.5109	0.4273	329.2	151.3	-
49	11	2878	Nov 01	07:39:31	3557	10869	P	-t	-0.8017	1.4312	0.3432	324.0	137.6	-
50	12	2896	Nov 11	15:07:55	3679	11092	P	-t	-0.8401	1.3629	0.2708	319.3	123.6	-
51	13	2914	Nov 23	22:44:30	3804	11315	P	-t	-0.8712	1.3076	0.2118	315.3	110.4	-
52	14	2932	Dec 04	06:27:49	3931	11538	P	-t	-0.8966	1.2627	0.1636	311.8	97.8	-
53	15	2950	Dec 15	14:18:10	4060	11761	P	-t	-0.9159	1.2287	0.1269	309.1	86.6	-

54	16	2968	Dec 25	22:13:36	4191	11984	P	-t	-0.9309	1.2023	0.0984	306.9	76.6	-
55	17	2987	Jan 06	06:11:45	4324	12207	P	-t	-0.9434	1.1800	0.0748	304.9	67.0	-
56	18	3005	Jan 17	14:13:07	4460	12430	P	-t	-0.9532	1.1624	0.0565	303.3	58.4	-
57	19	3023	Jan 28	22:14:41	4597	12653	P	-t	-0.9622	1.1457	0.0401	301.6	49.3	-
58	20	3041	Feb 08	06:15:20	4736	12876	P	-t	-0.9723	1.1267	0.0220	299.6	36.6	-
59	21	3059	Feb 19	14:12:24	4878	13099	Nx	-t	-0.9852	1.1022	-0.0007	296.9	-	-
60	22	3077	Mar 01	22:06:23	5021	13322	Nx	-t	-1.0006	1.0727	-0.0279	293.4	-	-
61	23	3095	Mar 13	05:54:33	5167	13545	Nx	-t	-1.0207	1.0342	-0.0634	288.9	-	-
62	24	3113	Mar 24	13:35:42	5314	13768	N	-t	-1.0465	0.9850	-0.1089	282.9	-	-
63	25	3131	Apr 04	21:09:41	5464	13991	N	-t	-1.0782	0.9249	-0.1651	275.3	-	-
64	26	3149	Apr 15	04:35:46	5616	14214	N	-t	-1.1165	0.8526	-0.2332	265.7	-	-
65	27	3167	Apr 26	11:53:58	5770	14437	N	-t	-1.1610	0.7686	-0.3126	253.8	-	-
66	28	3185	May 06	19:03:40	5926	14660	N	-t	-1.2124	0.6719	-0.4047	239.0	-	-
67	29	3203	May 18	02:06:38	6084	14883	N	-t	-1.2693	0.5651	-0.5068	220.8	-	-
68	30	3221	May 28	09:02:35	6244	15106	N	-t	-1.3320	0.4478	-0.6196	198.2	-	-
69	31	3239	Jun 08	15:52:00	6406	15329	N	-t	-1.3999	0.3209	-0.7420	169.3	-	-
70	32	3257	Jun 18	22:37:18	6570	15552	N	-t	-1.4712	0.1881	-0.8707	130.8	-	-
71	33	3275	Jun 30	05:18:43	6737	15775	Ne	-t	-1.5457	0.0495	-1.0054	67.7	-	-

SAROS SERIES

151

Saros series 151 contains 71 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-34	2096 Jun 06 02:43:41	194	1192	Nb t-	-1.5723	0.0047	-1.0584	21.2	-	-			
02	-33	2114 Jun 18 09:17:07	237	1415	N t-	-1.4944	0.1478	-0.9157	117.4	-	-			
03	-32	2132 Jun 28 15:45:35	282	1638	N t-	-1.4127	0.2981	-0.7663	164.7	-	-			
04	-31	2150 Jul 09 22:13:22	329	1861	N t-	-1.3300	0.4505	-0.6151	199.9	-	-			
05	-30	2168 Jul 20 04:38:50	368	2084	N t-	-1.2454	0.6065	-0.4607	228.9	-	-			
06	-29	2186 Jul 31 11:07:14	409	2307	N t-	-1.1629	0.7589	-0.3102	252.6	-	-			
07	-28	2204 Aug 11 17:37:23	453	2530	N t-	-1.0819	0.9088	-0.1627	272.6	-	-			
08	-27	2222 Aug 23 00:12:08	498	2753	Nx t-	-1.0042	1.0525	-0.0214	289.4	-	-			
09	-26	2240 Sep 02 06:52:16	545	2976	P t-	-0.9304	1.1894	0.1126	303.5	81.7	-			
10	-25	2258 Sep 13 13:39:53	595	3199	P t-	-0.8623	1.3159	0.2362	315.1	116.3	-			
11	-24	2276 Sep 23 20:35:24	646	3422	P t-	-0.8004	1.4311	0.3482	324.7	138.9	-			
12	-23	2294 Oct 05 03:38:22	700	3645	P t-	-0.7442	1.5356	0.4498	332.5	155.4	-			
13	-22	2312 Oct 16 10:51:23	755	3868	P t-	-0.6960	1.6257	0.5368	338.6	167.4	-			
14	-21	2330 Oct 27 18:12:55	813	4091	P t-	-0.6542	1.7038	0.6121	343.5	176.4	-			
15	-20	2348 Nov 07 01:44:25	873	4314	P t-	-0.6202	1.7674	0.6733	347.2	183.0	-			
16	-19	2366 Nov 18 09:23:06	935	4537	P t-	-0.5917	1.8207	0.7245	350.0	188.0	-			
17	-18	2384 Nov 28 17:11:03	999	4760	P t-	-0.5705	1.8604	0.7626	351.9	191.5	-			
18	-17	2402 Dec 10 01:04:27	1065	4983	P t-	-0.5534	1.8923	0.7935	353.2	194.1	-			
19	-16	2420 Dec 20 09:03:39	1133	5206	P t-	-0.5406	1.9159	0.8168	353.9	195.9	-			
20	-15	2438 Dec 31 17:06:05	1203	5429	P t-	-0.5300	1.9352	0.8365	354.4	197.3	-			

21	-14	2457	Jan 11	01:11:47	1275	5652	P	t-	-0.5215	1.9503	0.8527	354.5	198.3	-
22	-13	2475	Jan 22	09:16:58	1350	5875	P	t-	-0.5121	1.9665	0.8708	354.5	199.5	-
23	-12	2493	Feb 01	17:21:21	1426	6098	P	t-	-0.5016	1.9845	0.8915	354.5	200.8	-
24	-11	2511	Feb 14	01:22:52	1504	6321	P	t-	-0.4880	2.0077	0.9181	354.5	202.5	-
25	-10	2529	Feb 24	09:21:26	1585	6544	P	t-	-0.4712	2.0365	0.9508	354.6	204.5	-
26	-09	2547	Mar 07	17:12:49	1668	6767	P	t-	-0.4480	2.0768	0.9958	355.1	207.1	-
27	-08	2565	Mar 18	00:59:22	1752	6990	T	t-	-0.4202	2.1252	1.0492	355.6	210.0	35.6
28	-07	2583	Mar 29	08:37:39	1839	7213	T	t-	-0.3849	2.1873	1.1167	356.3	213.4	53.6
29	-06	2601	Apr 09	16:10:39	1928	7436	T	t-	-0.3445	2.2586	1.1937	357.1	216.8	67.3
30	-05	2619	Apr 20	23:33:42	2019	7659	T	p-	-0.2952	2.3461	1.2870	357.8	220.4	79.1
31	-04	2637	May 01	06:52:10	2112	7882	T-	p-	-0.2413	2.4421	1.3888	358.4	223.5	88.5
32	-03	2655	May 12	14:01:47	2207	8105	T-	pp	-0.1797	2.5521	1.5046	358.6	226.1	96.0
33	-02	2673	May 22	21:07:24	2304	8328	T-	pp	-0.1140	2.6700	1.6281	358.4	227.8	101.2
34	-01	2691	Jun 03	04:06:13	2403	8551	T-	pp	-0.0418	2.7998	1.7632	357.5	228.6	104.0
35	00	2709	Jun 14	11:03:25	2504	8774	T+	pp	0.0326	2.8141	1.7826	355.9	228.1	104.1
36	01	2727	Jun 25	17:57:08	2608	8997	T+	pp	0.1104	2.6689	1.6419	353.5	226.3	101.2
37	02	2745	Jul 06	00:50:21	2713	9220	T+	pp	0.1897	2.5214	1.4986	350.1	223.0	94.9
38	03	2763	Jul 17	07:43:39	2820	9443	T+	pp	0.2695	2.3731	1.3540	345.9	218.1	84.5
39	04	2781	Jul 27	14:38:59	2930	9666	T	-p	0.3484	2.2267	1.2108	340.8	211.8	68.4
40	05	2799	Aug 07	21:37:38	3042	9889	T	-t	0.4256	2.0836	1.0705	335.0	204.1	41.2
41	06	2817	Aug 18	04:40:17	3155	10112	P	-t	0.5002	1.9456	0.9347	328.5	194.9	-
42	07	2835	Aug 29	11:49:21	3271	10335	P	-t	0.5704	1.8160	0.8068	321.5	184.6	-
43	08	2853	Sep 08	19:05:00	3389	10558	P	-h	0.6356	1.6955	0.6877	314.2	173.3	-
44	09	2871	Sep 20	02:28:09	3509	10781	P	-h	0.6956	1.5850	0.5781	306.9	161.2	-
45	10	2889	Sep 30	09:59:39	3631	11004	P	-h	0.7495	1.4859	0.4796	299.7	148.7	-
46	11	2907	Oct 12	17:40:09	3755	11227	P	-a	0.7968	1.3988	0.3929	292.8	135.9	-
47	12	2925	Oct 23	01:29:54	3881	11450	P	-a	0.8370	1.3251	0.3194	286.4	123.5	-
48	13	2943	Nov 03	09:27:52	4009	11673	P	-a	0.8712	1.2622	0.2566	280.7	111.4	-

49	14	2961	Nov 13	17:35:24	4139	11896	P	-a	0.8982	1.2125	0.2071	275.8	100.5	-
50	15	2979	Nov 25	01:51:15	4272	12119	P	-a	0.9195	1.1734	0.1682	271.7	90.8	-
51	16	2997	Dec 05	10:15:08	4406	12342	P	-a	0.9348	1.1451	0.1403	268.5	83.0	-
52	17	3015	Dec 17	18:45:11	4542	12565	P	-a	0.9458	1.1246	0.1206	265.9	77.0	-
53	18	3033	Dec 28	03:21:05	4681	12788	P	-a	0.9528	1.1111	0.1083	264.0	72.9	-
54	19	3052	Jan 08	12:01:20	4822	13011	P	-a	0.9570	1.1026	0.1012	262.5	70.4	-
55	20	3070	Jan 18	20:43:31	4964	13234	P	-a	0.9606	1.0951	0.0957	261.0	68.3	-
56	21	3088	Jan 30	05:27:32	5109	13457	P	-a	0.9633	1.0888	0.0919	259.7	66.8	-
57	22	3106	Feb 10	14:10:28	5256	13680	P	-a	0.9677	1.0793	0.0853	258.1	64.3	-
58	23	3124	Feb 21	22:52:05	5405	13903	P	-a	0.9736	1.0667	0.0761	256.2	60.7	-
59	24	3142	Mar 04	07:28:52	5556	14126	P	-a	0.9842	1.0453	0.0586	253.4	53.3	-
60	25	3160	Mar 14	16:02:23	5709	14349	P	-a	0.9979	1.0181	0.0354	250.1	41.5	-
61	26	3178	Mar 26	00:29:36	5864	14572	P	-a	1.0175	0.9800	0.0017	245.7	9.0	-
62	27	3196	Apr 05	08:50:33	6021	14795	N	-a	1.0425	0.9318	-0.0420	240.1	-	-
63	28	3214	Apr 16	17:04:12	6180	15018	N	-a	1.0738	0.8721	-0.0971	233.1	-	-
64	29	3232	Apr 27	01:11:29	6342	15241	N	-a	1.1106	0.8022	-0.1625	224.6	-	-
65	30	3250	May 08	09:11:52	6505	15464	N	-a	1.1536	0.7213	-0.2392	214.2	-	-
66	31	3268	May 18	17:04:53	6671	15687	N	-a	1.2028	0.6289	-0.3275	201.4	-	-
67	32	3286	May 30	00:52:32	6838	15910	N	-a	1.2567	0.5280	-0.4247	185.9	-	-
68	33	3304	Jun 10	08:34:38	7008	16133	N	-a	1.3152	0.4192	-0.5303	167.1	-	-
69	34	3322	Jun 21	16:12:22	7180	16356	N	-a	1.3776	0.3032	-0.6433	143.5	-	-
70	35	3340	Jul 01	23:46:18	7353	16579	N	-a	1.4433	0.1816	-0.7628	112.1	-	-
71	36	3358	Jul 13	07:18:17	7529	16802	Ne	-a	1.5107	0.0570	-0.8857	63.5	-	-

SAROS SERIES

152

Saros series 152 contains 72 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-36	2107 May 07	04:30:24	220	1327	Nb a-	1.5588	0.0058	-1.0103	22.2	-	-		
02	-35	2125 May 17	11:46:31	264	1550	N a-	1.4923	0.1249	-0.8854	100.9	-	-		
03	-34	2143 May 28	18:59:24	311	1773	N a-	1.4219	0.2513	-0.7536	140.9	-	-		
04	-33	2161 Jun 08	02:08:54	352	1996	N a-	1.3475	0.3853	-0.6146	171.5	-	-		
05	-32	2179 Jun 19	09:16:11	393	2219	N a-	1.2701	0.5250	-0.4703	196.7	-	-		
06	-31	2197 Jun 29	16:22:52	435	2442	N a-	1.1911	0.6680	-0.3233	217.8	-	-		
07	-30	2215 Jul 11	23:30:24	480	2665	N a-	1.1114	0.8125	-0.1753	235.8	-	-		
08	-29	2233 Jul 22	06:40:42	526	2888	N a-	1.0328	0.9552	-0.0297	250.9	-	-		
09	-28	2251 Aug 02	13:53:15	575	3111	P a-	0.9548	1.0971	0.1145	263.8	75.6	-		
10	-27	2269 Aug 12	21:11:37	626	3334	P a-	0.8806	1.2324	0.2517	274.5	109.6	-		
11	-26	2287 Aug 24	04:35:07	678	3557	P a-	0.8094	1.3624	0.3829	283.4	132.2	-		
12	-25	2305 Sep 04	12:05:50	733	3780	P a-	0.7436	1.4828	0.5042	290.6	148.5	-		
13	-24	2323 Sep 15	19:43:08	790	4003	P a-	0.6823	1.5951	0.6167	296.5	160.9	-		

14	-23	2341	Sep 26	03:29:16	849	4226	P	a-	0.6276	1.6955	0.7172	301.1	170.2	-
15	-22	2359	Oct 07	11:23:43	910	4449	P	a-	0.5791	1.7845	0.8059	304.7	177.3	-
16	-21	2377	Oct 17	19:26:08	973	4672	P	a-	0.5368	1.8623	0.8833	307.4	182.7	-
17	-20	2395	Oct 29	03:37:44	1039	4895	P	a-	0.5017	1.9270	0.9474	309.4	186.6	-
18	-19	2413	Nov 08	11:57:24	1106	5118	P	a-	0.4733	1.9794	0.9993	310.7	189.5	-
19	-18	2431	Nov 19	20:25:36	1175	5341	T	a-	0.4513	2.0200	1.0394	311.6	191.4	29.6
20	-17	2449	Nov 30	04:59:05	1247	5564	T	a-	0.4334	2.0529	1.0721	312.1	192.8	39.5
21	-16	2467	Dec 11	13:39:54	1320	5787	T	a-	0.4214	2.0751	1.0943	312.3	193.7	44.8
22	-15	2485	Dec 21	22:24:27	1396	6010	T	a-	0.4123	2.0914	1.1110	312.2	194.2	48.3
23	-14	2504	Jan 03	07:13:07	1473	6233	T	p-	0.4063	2.1021	1.1225	312.0	194.5	50.5
24	-13	2522	Jan 13	16:02:19	1553	6456	T	p-	0.4007	2.1118	1.1333	311.8	194.7	52.4
25	-12	2540	Jan 25	00:52:56	1635	6679	T	p-	0.3958	2.1200	1.1432	311.5	195.0	54.1
26	-11	2558	Feb 04	09:41:29	1719	6902	T	p-	0.3892	2.1311	1.1564	311.3	195.4	56.3
27	-10	2576	Feb 15	18:27:33	1805	7125	T	p-	0.3803	2.1461	1.1739	311.2	196.1	59.0
28	-09	2594	Feb 26	03:08:54	1893	7348	T	p-	0.3674	2.1683	1.1989	311.3	197.0	62.5
29	-08	2612	Mar 09	11:45:52	1983	7571	T	p-	0.3508	2.1973	1.2308	311.6	198.3	66.7
30	-07	2630	Mar 20	20:15:16	2075	7794	T	p-	0.3279	2.2378	1.2746	312.1	199.9	71.7
31	-06	2648	Mar 31	04:38:32	2169	8017	T	p-	0.2996	2.2881	1.3281	312.9	201.8	76.9
32	-05	2666	Apr 11	12:53:42	2265	8240	T+	p-	0.2646	2.3506	1.3938	313.8	203.9	82.3
33	-04	2684	Apr 21	21:02:50	2364	8463	T+	p-	0.2245	2.4226	1.4689	314.7	206.0	87.4
34	-03	2702	May 04	05:02:21	2464	8686	T+	p-	0.1763	2.5096	1.5588	315.7	208.0	92.1
35	-02	2720	May 14	12:56:50	2567	8909	T+	p-	0.1238	2.6047	1.6564	316.5	209.7	95.8
36	-01	2738	May 25	20:43:19	2671	9132	T+	pp	0.0643	2.7129	1.7667	317.1	210.9	98.3
37	00	2756	Jun 05	04:26:06	2778	9355	T+	pp	0.0018	2.8267	1.8821	317.4	211.5	99.3
38	01	2774	Jun 16	12:01:40	2886	9578	T-	pp	-0.0668	2.7069	1.7634	317.1	211.2	98.5
39	02	2792	Jun 26	19:36:07	2997	9801	T-	p-	-0.1364	2.5789	1.6360	316.3	209.9	95.5
40	03	2810	Jul 08	03:06:03	3110	10024	T-	p-	-0.2100	2.4439	1.5009	314.9	207.5	89.7
41	04	2828	Jul 18	10:35:28	3225	10247	T	p-	-0.2838	2.3088	1.3651	312.8	203.9	80.6

42	05	2846	Jul 29	18:03:14	3342	10470	T	-a	-0.3588	2.1719	1.2268	310.0	199.0	66.6	
43	06	2864	Aug 09	01:33:03	3461	10693	T	-a	-0.4318	2.0389	1.0918	306.6	192.8	44.3	
44	07	2882	Aug 20	09:04:14	3582	10916	P	-a	-0.5034	1.9088	0.9591	302.5	185.4	-	
45	08	2900	Aug 31	16:38:06	3706	11139	P	-a	-0.5725	1.7836	0.8309	298.0	176.7	-	
46	09	2918	Sep 12	00:16:22	3831	11362	P	-a	-0.6373	1.6665	0.7101	293.1	166.9	-	
47	10	2936	Sep 22	07:59:30	3958	11585	P	-a	-0.6977	1.5577	0.5973	288.0	156.2	-	
48	11	2954	Oct 03	15:48:15	4088	11808	P	-a	-0.7528	1.4589	0.4940	282.9	144.6	-	
49	12	2972	Oct 13	23:42:46	4219	12031	P	-a	-0.8027	1.3698	0.4002	277.8	132.2	-	
50	13	2990	Oct 25	07:44:40	4353	12254	P	-a	-0.8460	1.2927	0.3182	273.2	119.6	-	
51	14	3008	Nov 05	15:53:13	4488	12477	P	-a	-0.8834	1.2266	0.2470	269.0	106.7	-	
52	15	3026	Nov 17	00:08:20	4626	12700	P	-a	-0.9149	1.1713	0.1869	265.4	93.8	-	
53	16	3044	Nov 27	08:30:19	4766	12923	P	-a	-0.9404	1.1270	0.1377	262.4	81.2	-	
54	17	3062	Dec 08	16:58:44	4908	13146	P	-a	-0.9599	1.0936	0.0997	260.3	69.6	-	
55	18	3080	Dec 19	01:31:56	5052	13369	P	-a	-0.9753	1.0673	0.0691	258.8	58.4	-	
56	19	3098	Dec 30	10:08:34	5198	13592	P	-a	-0.9876	1.0468	0.0446	257.7	47.2	-	
57	20	3117	Jan 10	18:48:09	5346	13815	P	-a	-0.9970	1.0314	0.0258	257.1	36.1	-	
58	21	3135	Jan 22	03:29:17	5496	14038	P	-a	-1.0044	1.0193	0.0108	256.7	23.4	-	
59	22	3153	Feb 01	12:09:07	5648	14261	Nx	-a	-1.0125	1.0056	-0.0053	256.2	-	-	
60	23	3171	Feb 12	20:47:24	5803	14484	N	-a	-1.0212	0.9906	-0.0223	255.4	-	-	
61	24	3189	Feb 23	05:21:21	5959	14707	N	-a	-1.0331	0.9695	-0.0449	254.0	-	-	
62	25	3207	Mar 06	13:51:18	6117	14930	N	-a	-1.0476	0.9436	-0.0719	252.1	-	-	
63	26	3225	Mar 16	22:13:08	6278	15153	N	-a	-1.0679	0.9066	-0.1096	248.8	-	-	
64	27	3243	Mar 28	06:29:01	6440	15376	N	-a	-1.0924	0.8619	-0.1548	244.4	-	-	
65	28	3261	Apr 07	14:35:21	6605	15599	N	-a	-1.1241	0.8038	-0.2131	238.2	-	-	
66	29	3279	Apr 18	22:33:47	6772	15822	N	-a	-1.1615	0.7353	-0.2819	230.1	-	-	
67	30	3297	Apr 29	06:21:41	6941	16045	N	-a	-1.2069	0.6521	-0.3653	219.2	-	-	
68	31	3315	May 11	14:01:42	7112	16268	N	-a	-1.2578	0.5588	-0.4589	205.4	-	-	
69	32	3333	May 21	21:31:56	7285	16491	N	-a	-1.3159	0.4525	-0.5657	187.4	-	-	

70	33	3351	Jun 02	04:53:36	7460	16714	N	-h	-1.3800	0.3353	-0.6837	163.7	-	-
71	34	3369	Jun 12	12:07:11	7637	16937	N	-h	-1.4497	0.2079	-0.8122	130.9	-	-
72	35	3387	Jun 23	19:14:11	7816	17160	Ne	-h	-1.5239	0.0726	-0.9490	78.6	-	-

SAROS SERIES

153

Saros series 153 contains 71 lunar eclipses.

PHASE													
DURATIONS													
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-37	2136	Apr 16	17:08:45	292	1685	Nb a-	-1.5241	0.0396	-0.9174	53.3	-	-
02	-36	2154	Apr 28	01:04:33	337	1908	N a-	-1.4784	0.1228	-0.8328	93.2	-	-
03	-35	2172	May 08	08:53:18	377	2131	N a-	-1.4275	0.2157	-0.7389	122.7	-	-
04	-34	2190	May 19	16:35:26	418	2354	N a-	-1.3714	0.3183	-0.6357	147.8	-	-
05	-33	2208	May 31	00:10:37	462	2577	N a-	-1.3102	0.4305	-0.5233	170.4	-	-
06	-32	2226	Jun 11	07:41:30	508	2800	N a-	-1.2459	0.5488	-0.4056	190.6	-	-

07	-31	2244	Jun 21	15:07:43	555	3023	N	a-	-1.1783	0.6734	-0.2820	209.0	-	-
08	-30	2262	Jul 02	22:31:30	605	3246	N	a-	-1.1089	0.8015	-0.1556	225.7	-	-
09	-29	2280	Jul 13	05:52:36	657	3469	N	a-	-1.0376	0.9334	-0.0259	240.9	-	-
10	-28	2298	Jul 24	13:14:16	711	3692	P	a-	-0.9673	1.0639	0.1017	254.5	70.0	-
11	-27	2316	Aug 04	20:36:17	767	3915	P	a-	-0.8979	1.1930	0.2273	266.6	103.1	-
12	-26	2334	Aug 16	03:59:52	826	4138	P	a-	-0.8304	1.3190	0.3493	277.3	125.9	-
13	-25	2352	Aug 26	11:26:40	886	4361	P	a-	-0.7660	1.4394	0.4651	286.8	143.1	-
14	-24	2370	Sep 06	18:57:22	948	4584	P	a-	-0.7056	1.5529	0.5736	295.0	156.7	-
15	-23	2388	Sep 17	02:33:17	1013	4807	P	a-	-0.6501	1.6574	0.6727	302.2	167.5	-
16	-22	2406	Sep 28	10:14:02	1079	5030	P	a-	-0.5994	1.7532	0.7629	308.4	176.2	-
17	-21	2424	Oct 08	18:01:43	1148	5253	P	a-	-0.5553	1.8371	0.8409	313.7	183.0	-
18	-20	2442	Oct 20	01:55:57	1218	5476	P	a-	-0.5172	1.9101	0.9079	318.3	188.4	-
19	-19	2460	Oct 30	09:56:53	1291	5699	P	a-	-0.4853	1.9716	0.9636	322.2	192.7	-
20	-18	2478	Nov 10	18:04:53	1366	5922	T	p-	-0.4598	2.0213	1.0074	325.5	195.9	13.3
21	-17	2496	Nov 21	02:19:04	1442	6145	T	p-	-0.4399	2.0605	1.0411	328.4	198.4	31.1
22	-16	2514	Dec 03	10:39:16	1521	6368	T	p-	-0.4258	2.0891	1.0644	330.8	200.3	38.8
23	-15	2532	Dec 13	19:02:44	1602	6591	T	p-	-0.4148	2.1117	1.0822	332.9	201.8	43.7
24	-14	2550	Dec 25	03:31:04	1685	6814	T	p-	-0.4084	2.1256	1.0918	334.7	202.8	46.1
25	-13	2569	Jan 04	12:00:29	1770	7037	T	p-	-0.4031	2.1372	1.0997	336.4	203.8	48.0
26	-12	2587	Jan 15	20:31:07	1858	7260	T	p-	-0.3996	2.1452	1.1046	337.9	204.6	49.2
27	-11	2605	Jan 27	04:58:58	1947	7483	T	p-	-0.3944	2.1561	1.1129	339.4	205.6	51.1
28	-10	2623	Feb 07	13:25:20	2038	7706	T	p-	-0.3887	2.1676	1.1224	341.0	206.7	53.2
29	-09	2641	Feb 17	21:46:04	2132	7929	T	p-	-0.3787	2.1866	1.1401	342.7	208.1	56.7
30	-08	2659	Mar 01	06:01:08	2227	8152	T	p-	-0.3649	2.2123	1.1648	344.5	209.9	61.2
31	-07	2677	Mar 11	14:08:06	2325	8375	T	p-	-0.3451	2.2490	1.2010	346.6	212.2	67.0
32	-06	2695	Mar 22	22:07:31	2424	8598	T	p-	-0.3199	2.2952	1.2470	348.9	214.8	73.3
33	-05	2713	Apr 03	05:57:08	2526	8821	T	p-	-0.2874	2.3551	1.3067	351.4	217.8	80.1
34	-04	2731	Apr 14	13:37:27	2630	9044	T-	pp	-0.2478	2.4277	1.3794	353.9	221.0	87.0

35	-03	2749	Apr 24	21:07:32	2735	9267	T-	pp	-0.2004	2.5144	1.4663	356.5	224.1	93.4
36	-02	2767	May 06	04:28:53	2843	9490	T-	pp	-0.1468	2.6128	1.5648	358.9	226.9	98.8
37	-01	2785	May 16	11:39:40	2953	9713	T-	pp	-0.0850	2.7262	1.6781	361.0	229.2	102.8
38	00	2803	May 27	18:42:59	3065	9936	T-	pp	-0.0179	2.8496	1.8012	362.5	230.6	104.8
39	01	2821	Jun 07	01:37:38	3179	10159	T+	pp	0.0556	2.7807	1.7316	363.3	230.9	104.4
40	02	2839	Jun 18	08:27:21	3296	10382	T+	pp	0.1326	2.6398	1.5898	363.3	229.8	100.8
41	03	2857	Jun 28	15:09:08	3414	10605	T+	pp	0.2153	2.4889	1.4375	362.2	226.9	92.9
42	04	2875	Jul 09	21:48:44	3534	10828	T	-t	0.2988	2.3364	1.2834	360.1	222.2	79.5
43	05	2893	Jul 20	04:23:43	3657	11051	T	-t	0.3852	2.1790	1.1239	356.6	215.3	55.6
44	06	2911	Aug 01	10:59:11	3781	11274	P	-t	0.4704	2.0238	0.9662	352.0	206.1	-
45	07	2929	Aug 11	17:32:45	3908	11497	P	-t	0.5564	1.8676	0.8070	346.1	194.2	-
46	08	2947	Aug 23	00:10:11	4036	11720	P	-t	0.6384	1.7187	0.6549	339.2	179.9	-
47	09	2965	Sep 02	06:49:42	4167	11943	P	-t	0.7177	1.5750	0.5077	331.3	162.5	-
48	10	2983	Sep 13	13:34:03	4300	12166	P	-t	0.7923	1.4399	0.3688	322.6	141.7	-
49	11	3001	Sep 24	20:23:38	4435	12389	P	-t	0.8622	1.3139	0.2387	313.3	116.4	-
50	12	3019	Oct 06	03:20:34	4572	12612	P	-t	0.9255	1.1997	0.1204	303.8	84.2	-
51	13	3037	Oct 16	10:25:20	4710	12835	P	-t	0.9820	1.0981	0.0148	294.5	29.9	-
52	14	3055	Oct 27	17:37:19	4852	13058	Nx	-t	1.0322	1.0080	-0.0794	285.3	-	-
53	15	3073	Nov 07	00:58:40	4995	13281	N	-t	1.0746	0.9322	-0.1591	277.0	-	-
54	16	3091	Nov 18	08:28:00	5140	13504	N	-t	1.1104	0.8682	-0.2266	269.4	-	-
55	17	3109	Nov 29	16:05:51	5287	13727	N	-t	1.1393	0.8168	-0.2812	263.0	-	-
56	18	3127	Dec 10	23:50:15	5436	13950	N	-t	1.1628	0.7750	-0.3257	257.4	-	-
57	19	3145	Dec 21	07:41:48	5588	14173	N	-t	1.1806	0.7435	-0.3593	253.0	-	-
58	20	3164	Jan 01	15:37:48	5741	14396	N	-t	1.1947	0.7183	-0.3859	249.4	-	-
59	21	3182	Jan 11	23:37:17	5897	14619	N	-t	1.2061	0.6978	-0.4071	246.3	-	-
60	22	3200	Jan 23	07:38:45	6055	14842	N	-t	1.2159	0.6797	-0.4251	243.4	-	-
61	23	3218	Feb 02	15:41:18	6214	15065	N	-t	1.2251	0.6625	-0.4415	240.5	-	-
62	24	3236	Feb 13	23:41:31	6376	15288	N	-t	1.2360	0.6416	-0.4608	236.9	-	-

												PHASE		
												DURATIONS		
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														

01	-33	2237	May 10	23:45:33	536	2935	N	t-	1.5296	0.0863	-0.9832	90.2	-	-
02	-32	2255	May 22	06:33:13	585	3158	N	t-	1.4629	0.2082	-0.8604	138.7	-	-
03	-31	2273	Jun 01	13:13:38	637	3381	N	t-	1.3902	0.3413	-0.7267	175.7	-	-
04	-30	2291	Jun 12	19:47:41	690	3604	N	t-	1.3123	0.4841	-0.5835	206.7	-	-
05	-29	2309	Jun 24	02:17:42	745	3827	N	t-	1.2308	0.6337	-0.4340	233.4	-	-
06	-28	2327	Jul 05	08:44:32	802	4050	N	t-	1.1463	0.7888	-0.2792	256.7	-	-
07	-27	2345	Jul 15	15:10:59	862	4273	N	t-	1.0613	0.9453	-0.1235	276.8	-	-
08	-26	2363	Jul 26	21:36:02	923	4496	P	t-	0.9748	1.1044	0.0346	294.5	45.8	-
09	-25	2381	Aug 06	04:04:39	987	4719	P	t-	0.8908	1.2594	0.1881	309.5	104.5	-
10	-24	2399	Aug 17	10:35:26	1053	4942	P	t-	0.8080	1.4121	0.3391	322.3	137.2	-
11	-23	2417	Aug 27	17:11:33	1120	5165	P	t-	0.7295	1.5573	0.4822	333.0	160.1	-
12	-22	2435	Sep 07	23:52:36	1190	5388	P	t-	0.6545	1.6959	0.6186	341.9	177.3	-
13	-21	2453	Sep 18	06:42:17	1262	5611	P	t-	0.5863	1.8223	0.7426	349.0	190.2	-
14	-20	2471	Sep 29	13:39:37	1336	5834	P	t-	0.5238	1.9383	0.8561	354.7	200.0	-
15	-19	2489	Oct 09	20:45:34	1412	6057	P	t-	0.4679	2.0422	0.9575	359.2	207.5	-
16	-18	2507	Oct 22	04:00:56	1490	6280	T	t-	0.4193	2.1325	1.0454	362.6	213.0	34.7
17	-17	2525	Nov 01	11:26:31	1570	6503	T	t-	0.3790	2.2076	1.1183	365.0	216.9	54.7
18	-16	2543	Nov 12	19:00:51	1652	6726	T	t-	0.3451	2.2708	1.1796	366.7	219.8	65.9
19	-15	2561	Nov 23	02:43:40	1737	6949	T	p-	0.3178	2.3216	1.2289	367.8	221.8	73.1
20	-14	2579	Dec 04	10:34:13	1823	7172	T	p-	0.2963	2.3615	1.2678	368.5	223.1	77.8
21	-13	2597	Dec 14	18:32:07	1911	7395	T	p-	0.2805	2.3907	1.2965	368.7	223.9	80.9
22	-12	2615	Dec 27	02:33:58	2002	7618	T+	p-	0.2678	2.4139	1.3201	368.6	224.5	83.1
23	-11	2634	Jan 06	10:40:40	2094	7841	T+	p-	0.2586	2.4303	1.3374	368.3	224.7	84.7
24	-10	2652	Jan 17	18:48:27	2189	8064	T+	p-	0.2501	2.4451	1.3539	367.7	224.9	86.0
25	-09	2670	Jan 28	02:57:43	2286	8287	T+	p-	0.2422	2.4583	1.3696	367.1	225.1	87.3
26	-08	2688	Feb 08	11:03:30	2385	8510	T+	p-	0.2311	2.4771	1.3915	366.4	225.4	88.9
27	-07	2706	Feb 19	19:08:31	2485	8733	T+	p-	0.2189	2.4976	1.4159	365.6	225.7	90.7
28	-06	2724	Mar 02	03:07:53	2588	8956	T+	p-	0.2019	2.5265	1.4492	364.8	226.2	92.8

29	-05	2742	Mar 13	11:02:37	2693	9179	T+	p-	0.1801	2.5639	1.4916	364.0	226.8	95.3
30	-04	2760	Mar 23	18:49:54	2801	9402	T+	pp	0.1517	2.6135	1.5465	363.2	227.6	98.0
31	-03	2778	Apr 04	02:31:48	2910	9625	T+	pp	0.1179	2.6725	1.6113	362.3	228.2	100.5
32	-02	2796	Apr 14	10:05:56	3021	9848	T+	pp	0.0771	2.7444	1.6891	361.2	228.7	102.6
33	-01	2814	Apr 25	17:33:04	3134	10071	T+	pp	0.0297	2.8283	1.7790	359.9	228.9	103.9
34	00	2832	May 06	00:53:25	3250	10294	T-	pp	-0.0242	2.8354	1.7921	358.2	228.4	103.9
35	01	2850	May 17	08:08:10	3367	10517	T-	pp	-0.0838	2.7230	1.6857	356.0	227.2	102.3
36	02	2868	May 27	15:16:52	3487	10740	T-	pp	-0.1491	2.6003	1.5686	353.1	224.9	98.4
37	03	2886	Jun 07	22:21:31	3608	10963	T-	pp	-0.2186	2.4700	1.4438	349.6	221.5	91.5
38	04	2904	Jun 19	05:22:46	3732	11186	T	pp	-0.2919	2.3330	1.3119	345.2	216.6	80.5
39	05	2922	Jun 30	12:22:26	3857	11409	T	-p	-0.3673	2.1923	1.1757	339.9	210.2	63.1
40	06	2940	Jul 10	19:20:01	3985	11632	T	-t	-0.4453	2.0470	1.0346	333.6	202.0	29.2
41	07	2958	Jul 22	02:19:20	4115	11855	P	-t	-0.5226	1.9034	0.8946	326.5	192.0	-
42	08	2976	Aug 01	09:19:40	4247	12078	P	-t	-0.6000	1.7599	0.7543	318.4	180.1	-
43	09	2994	Aug 12	16:24:46	4381	12301	P	-t	-0.6741	1.6226	0.6196	309.7	166.3	-
44	10	3012	Aug 23	23:32:38	4517	12524	P	-t	-0.7467	1.4883	0.4874	300.3	150.2	-
45	11	3030	Sep 04	06:48:19	4655	12747	P	-h	-0.8138	1.3643	0.3651	290.6	132.0	-
46	12	3048	Sep 14	14:09:11	4796	12970	P	-h	-0.8775	1.2469	0.2488	280.6	110.5	-
47	13	3066	Sep 25	21:38:35	4938	13193	P	-a	-0.9348	1.1413	0.1441	270.6	85.0	-
48	14	3084	Oct 06	05:15:21	5082	13416	P	-a	-0.9869	1.0455	0.0487	260.9	49.9	-
49	15	3102	Oct 18	13:02:00	5229	13639	N	-a	-1.0316	0.9632	-0.0333	251.8	-	-
50	16	3120	Oct 28	20:57:19	5377	13862	N	-a	-1.0702	0.8925	-0.1040	243.5	-	-
51	17	3138	Nov 09	05:01:03	5528	14085	N	-a	-1.1026	0.8329	-0.1636	236.0	-	-
52	18	3156	Nov 19	13:14:09	5681	14308	N	-a	-1.1280	0.7864	-0.2101	229.8	-	-
53	19	3174	Nov 30	21:35:04	5835	14531	N	-a	-1.1474	0.7507	-0.2456	224.7	-	-
54	20	3192	Dec 11	06:03:39	5992	14754	N	-a	-1.1615	0.7247	-0.2714	220.8	-	-
55	21	3210	Dec 22	14:37:19	6151	14977	N	-a	-1.1720	0.7052	-0.2903	217.7	-	-
56	22	3229	Jan 01	23:17:03	6312	15200	N	-a	-1.1781	0.6934	-0.3011	215.5	-	-

57	23	3247	Jan 13	07:59:48	6475	15423	N	-a	-1.1822	0.6851	-0.3080	213.9	-	-
58	24	3265	Jan 23	16:45:01	6640	15646	N	-a	-1.1848	0.6795	-0.3118	212.6	-	-
59	25	3283	Feb 04	01:30:21	6807	15869	N	-a	-1.1878	0.6728	-0.3161	211.2	-	-
60	26	3301	Feb 15	10:15:28	6977	16092	N	-a	-1.1916	0.6645	-0.3217	209.5	-	-
61	27	3319	Feb 26	18:57:38	7148	16315	N	-a	-1.1983	0.6507	-0.3324	207.1	-	-
62	28	3337	Mar 09	03:36:09	7321	16538	N	-a	-1.2083	0.6304	-0.3491	203.7	-	-
63	29	3355	Mar 20	12:09:50	7497	16761	N	-a	-1.2229	0.6018	-0.3739	199.1	-	-
64	30	3373	Mar 30	20:38:34	7674	16984	N	-a	-1.2417	0.5652	-0.4066	193.2	-	-
65	31	3391	Apr 11	04:59:33	7854	17207	N	-a	-1.2676	0.5157	-0.4519	185.0	-	-
66	32	3409	Apr 22	13:14:36	8036	17430	N	-a	-1.2986	0.4567	-0.5068	174.7	-	-
67	33	3427	May 03	21:21:44	8219	17653	N	-a	-1.3365	0.3851	-0.5743	161.2	-	-
68	34	3445	May 14	05:23:22	8405	17876	N	-a	-1.3790	0.3053	-0.6504	144.3	-	-
69	35	3463	May 25	13:16:14	8593	18099	N	-a	-1.4288	0.2120	-0.7401	121.1	-	-
70	36	3481	Jun 04	21:05:01	8783	18322	N	-a	-1.4822	0.1124	-0.8365	88.8	-	-
71	37	3499	Jun 16	04:46:54	8975	18545	Ne	-a	-1.5416	0.0020	-0.9442	11.9	-	-

SAROS SERIES

155

Saros series 155 contains 73 lunar eclipses.

													PHASE
													DURATIONS
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-37	2212 Mar 18 09:06:46	471	2624	N	a-	-1.5477	0.0361	-0.9998	55.5	-	-	
02	-36	2230 Mar 29 16:58:24	518	2847	N	a-	-1.5105	0.1012	-0.9285	91.9	-	-	
03	-35	2248 Apr 09 00:42:30	566	3070	N	a-	-1.4664	0.1790	-0.8443	120.9	-	-	
04	-34	2266 Apr 20 08:20:18	616	3293	N	a-	-1.4163	0.2677	-0.7494	145.9	-	-	
05	-33	2284 Apr 30 15:51:43	669	3516	N	a-	-1.3601	0.3677	-0.6431	168.7	-	-	
06	-32	2302 May 12 23:17:54	723	3739	N	a-	-1.2986	0.4776	-0.5273	189.4	-	-	
07	-31	2320 May 23 06:38:12	780	3962	N	a-	-1.2312	0.5984	-0.4008	208.6	-	-	
08	-30	2338 Jun 03 13:55:27	838	4185	N	a-	-1.1602	0.7259	-0.2680	225.8	-	-	
09	-29	2356 Jun 13 21:09:23	899	4408	N	a-	-1.0858	0.8601	-0.1291	241.4	-	-	
10	-28	2374 Jun 25 04:21:36	962	4631	P	a-	-1.0090	0.9989	0.0140	255.3	26.9	- *	
11	-27	2392 Jul 05 11:33:11	1026	4854	P	a-	-0.9306	1.1410	0.1598	267.6	88.7	-	
12	-26	2410 Jul 16 18:45:58	1093	5077	P	a-	-0.8523	1.2829	0.3050	278.2	119.7	-	
13	-25	2428 Jul 27 02:01:20	1162	5300	P	a-	-0.7754	1.4228	0.4474	287.2	141.5	-	
14	-24	2446 Aug 07 09:19:05	1233	5523	P	a-	-0.6995	1.5609	0.5875	294.9	158.2	-	
15	-23	2464 Aug 17 16:42:26	1306	5746	P	a-	-0.6277	1.6921	0.7201	301.2	170.9	-	
16	-22	2482 Aug 29 00:10:16	1382	5969	P	a-	-0.5588	1.8179	0.8468	306.3	180.9	-	
17	-21	2500 Sep 09 07:45:59	1459	6192	P	a-	-0.4957	1.9335	0.9628	310.3	188.5	-	
18	-20	2518 Sep 20 15:27:28	1538	6415	T	a-	-0.4370	2.0413	1.0707	313.4	194.4	39.5	
19	-19	2536 Sep 30 23:18:44	1620	6638	T	a-	-0.3856	2.1357	1.1647	315.6	198.7	58.5	
20	-18	2554 Oct 12 07:17:08	1703	6861	T	p-	-0.3398	2.2201	1.2485	317.3	201.9	69.7	
21	-17	2572 Oct 22 15:24:53	1789	7084	T	p-	-0.3012	2.2913	1.3190	318.4	204.1	76.9	

22	-16	2590	Nov 02	23:40:12	1876	7307	T-	p-	-0.2685	2.3518	1.3786	319.1	205.7	81.9
23	-15	2608	Nov 14	08:04:33	1966	7530	T-	p-	-0.2426	2.3997	1.4256	319.5	206.7	85.1
24	-14	2626	Nov 25	16:35:27	2058	7753	T-	p-	-0.2223	2.4374	1.4626	319.7	207.3	87.3
25	-13	2644	Dec 06	01:12:54	2151	7976	T-	p-	-0.2069	2.4659	1.4906	319.7	207.6	88.8
26	-12	2662	Dec 17	09:55:29	2247	8199	T-	p-	-0.1956	2.4867	1.5111	319.6	207.8	89.8
27	-11	2680	Dec 27	18:43:05	2345	8422	T-	p-	-0.1879	2.5008	1.5253	319.4	207.9	90.4
28	-10	2699	Jan 08	03:32:27	2445	8645	T-	p-	-0.1816	2.5121	1.5371	319.2	207.9	90.8
29	-09	2717	Jan 19	12:23:43	2548	8868	T-	p-	-0.1768	2.5205	1.5464	318.9	207.9	91.2
30	-08	2735	Jan 30	21:13:45	2652	9091	T-	p-	-0.1706	2.5312	1.5584	318.6	208.0	91.7
31	-07	2753	Feb 10	06:03:22	2758	9314	T-	p-	-0.1639	2.5425	1.5715	318.4	208.1	92.2
32	-06	2771	Feb 21	14:47:55	2866	9537	T-	p-	-0.1527	2.5621	1.5931	318.2	208.4	93.1
33	-05	2789	Mar 03	23:29:51	2977	9760	T-	p-	-0.1391	2.5859	1.6193	318.1	208.8	94.1
34	-04	2807	Mar 15	08:04:45	3089	9983	T-	p-	-0.1195	2.6205	1.6566	318.1	209.3	95.3
35	-03	2825	Mar 25	16:34:39	3204	10206	T-	p-	-0.0956	2.6629	1.7017	318.1	209.9	96.5
36	-02	2843	Apr 06	00:55:44	3320	10429	T-	pp	-0.0642	2.7192	1.7608	318.2	210.5	97.7
37	-01	2861	Apr 16	09:11:05	3439	10652	T-	pp	-0.0280	2.7842	1.8286	318.2	210.9	98.6
38	00	2879	Apr 27	17:18:01	3560	10875	T+	pp	0.0154	2.8060	1.8529	318.0	211.1	98.8
39	01	2897	May 08	01:17:49	3683	11098	T+	pp	0.0647	2.7144	1.7636	317.6	210.8	98.1
40	02	2915	May 20	09:10:06	3808	11321	T+	-p	0.1200	2.6119	1.6631	317.0	210.0	96.0
41	03	2933	May 30	16:56:40	3935	11544	T+	-p	0.1800	2.5011	1.5539	315.8	208.4	92.1
42	04	2951	Jun 11	00:37:15	4064	11767	T+	-p	0.2448	2.3816	1.4354	314.1	205.7	85.7
43	05	2969	Jun 21	08:12:26	4195	11990	T	-p	0.3140	2.2544	1.3088	311.8	201.9	75.6
44	06	2987	Jul 02	15:44:11	4328	12213	T	-a	0.3856	2.1229	1.1772	308.7	196.8	59.8
45	07	3005	Jul 13	23:13:22	4463	12436	T	-a	0.4589	1.9888	1.0424	304.8	190.2	30.5
46	08	3023	Jul 25	06:40:39	4601	12659	P	-a	0.5335	1.8525	0.9049	300.1	181.9	-
47	09	3041	Aug 04	14:07:39	4740	12882	P	-a	0.6081	1.7167	0.7672	294.7	171.7	-
48	10	3059	Aug 15	21:35:48	4882	13105	P	-a	0.6812	1.5839	0.6318	288.4	159.5	-
49	11	3077	Aug 26	05:06:33	5025	13328	P	-a	0.7515	1.4564	0.5012	281.6	145.3	-

50	12	3095	Sep 06	12:39:07	5171	13551	P	-a	0.8199	1.3328	0.3739	274.1	128.2	-
51	13	3113	Sep 17	20:16:45	5318	13774	P	-a	0.8834	1.2182	0.2553	266.3	108.0	-
52	14	3131	Sep 29	03:58:39	5468	13997	P	-a	0.9430	1.1113	0.1438	258.2	82.5	-
53	15	3149	Oct 09	11:47:09	5620	14220	P	-a	0.9965	1.0155	0.0432	250.2	45.9	-
54	16	3167	Oct 20	19:40:44	5774	14443	N	-a	1.0452	0.9287	-0.0488	242.4	-	-
55	17	3185	Oct 31	03:42:04	5930	14666	N	-a	1.0870	0.8547	-0.1280	235.1	-	-
56	18	3203	Nov 11	11:49:47	6088	14889	N	-a	1.1230	0.7912	-0.1968	228.5	-	-
57	19	3221	Nov 21	20:03:51	6248	15112	N	-a	1.1534	0.7382	-0.2550	222.8	-	-
58	20	3239	Dec 03	04:24:23	6410	15335	N	-a	1.1780	0.6956	-0.3027	218.0	-	-
59	21	3257	Dec 13	12:50:24	6575	15558	N	-a	1.1978	0.6616	-0.3415	214.1	-	-
60	22	3275	Dec 24	21:21:38	6741	15781	N	-a	1.2128	0.6364	-0.3712	211.2	-	-
61	23	3294	Jan 04	05:55:01	6909	16004	N	-a	1.2258	0.6146	-0.3970	208.7	-	-
62	24	3312	Jan 16	14:32:07	7080	16227	N	-a	1.2353	0.5989	-0.4163	207.1	-	-
63	25	3330	Jan 26	23:09:09	7253	16450	N	-a	1.2449	0.5827	-0.4354	205.3	-	-
64	26	3348	Feb 07	07:46:09	7427	16673	N	-a	1.2540	0.5674	-0.4532	203.6	-	-
65	27	3366	Feb 17	16:19:28	7604	16896	N	-a	1.2656	0.5471	-0.4755	200.9	-	-
66	28	3384	Feb 29	00:50:02	7783	17119	N	-a	1.2790	0.5232	-0.5009	197.6	-	-
67	29	3402	Mar 12	09:14:29	7964	17342	N	-a	1.2970	0.4908	-0.5344	192.5	-	-
68	30	3420	Mar 22	17:32:23	8147	17565	N	-a	1.3197	0.4495	-0.5764	185.6	-	-
69	31	3438	Apr 03	01:42:09	8332	17788	N	-a	1.3483	0.3972	-0.6291	175.8	-	-
70	32	3456	Apr 13	09:43:56	8519	18011	N	-a	1.3824	0.3348	-0.6919	162.9	-	-
71	33	3474	Apr 24	17:35:45	8708	18234	N	-a	1.4238	0.2589	-0.7680	144.7	-	-
72	34	3492	May 05	01:18:38	8899	18457	N	-a	1.4717	0.1712	-0.8559	119.0	-	-
73	35	3510	May 17	08:51:32	9092	18680	Ne	-h	1.5264	0.0710	-0.9564	77.5	-	-

SAROS SERIES

156

Saros series 156 contains 81 lunar eclipses.

PHASE													
DURATIONS													
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-48	2060 Nov 08	04:04:15	115	752	N a-	1.5332	0.0266	-0.9375	43.6	-	-	
02	-47	2078 Nov 19	12:40:04	154	975	N a-	1.5147	0.0615	-0.9047	66.0	-	-	
03	-46	2096 Nov 29	21:22:22	195	1198	N a-	1.5017	0.0862	-0.8816	78.1	-	-	
04	-45	2114 Dec 12	06:09:26	238	1421	N a-	1.4932	0.1026	-0.8666	85.0	-	-	
05	-44	2132 Dec 22	14:59:51	283	1644	N a-	1.4873	0.1138	-0.8564	89.5	-	-	
06	-43	2151 Jan 02	23:51:26	330	1867	N a-	1.4828	0.1225	-0.8484	92.8	-	-	
07	-42	2169 Jan 13	08:43:52	369	2090	N a-	1.4794	0.1288	-0.8423	95.1	-	-	
08	-41	2187 Jan 24	17:35:19	410	2313	N a-	1.4758	0.1353	-0.8356	97.5	-	-	
09	-40	2205 Feb 05	02:23:28	454	2536	N a-	1.4699	0.1458	-0.8245	101.2	-	-	
10	-39	2223 Feb 16	11:07:58	499	2759	N a-	1.4616	0.1605	-0.8088	106.1	-	-	
11	-38	2241 Feb 26	19:46:41	547	2982	N a-	1.4489	0.1833	-0.7848	113.2	-	-	
12	-37	2259 Mar 10	04:19:51	596	3205	N a-	1.4323	0.2131	-0.7537	121.8	-	-	
13	-36	2277 Mar 20	12:44:38	648	3428	N a-	1.4094	0.2543	-0.7109	132.7	-	-	

14	-35	2295	Mar 31	21:02:51	701	3651	N	a-	1.3816	0.3044	-0.6593	144.6	-	-
15	-34	2313	Apr 12	05:12:28	757	3874	N	a-	1.3473	0.3667	-0.5956	158.0	-	-
16	-33	2331	Apr 23	13:14:05	815	4097	N	a-	1.3070	0.4401	-0.5211	172.1	-	-
17	-32	2349	May 03	21:07:25	875	4320	N	a-	1.2602	0.5254	-0.4348	186.8	-	-
18	-31	2367	May 15	04:53:36	937	4543	N	a-	1.2082	0.6207	-0.3390	201.5	-	-
19	-30	2385	May 25	12:32:57	1001	4766	N	a-	1.1510	0.7256	-0.2340	216.1	-	-
20	-29	2403	Jun 05	20:05:08	1067	4989	N	a-	1.0884	0.8406	-0.1195	230.4	-	-
21	-28	2421	Jun 16	03:32:46	1135	5212	P	a-	1.0225	0.9621	0.0011	244.0	7.3	-
22	-27	2439	Jun 27	10:55:58	1205	5435	P	a-	0.9531	1.0901	0.1276	256.9	78.1	-
23	-26	2457	Jul 07	18:16:32	1277	5658	P	a-	0.8822	1.2213	0.2567	268.8	109.1	-
24	-25	2475	Jul 19	01:34:32	1352	5881	P	a-	0.8096	1.3559	0.3885	279.9	132.0	-
25	-24	2493	Jul 29	08:53:05	1428	6104	P	a-	0.7379	1.4891	0.5184	289.8	150.0	-
26	-23	2511	Aug 10	16:12:02	1507	6327	P	a-	0.6669	1.6215	0.6468	298.8	164.6	-
27	-22	2529	Aug 20	23:32:24	1587	6550	P	a-	0.5976	1.7509	0.7718	306.8	176.6	-
28	-21	2547	Sep 01	06:56:14	1670	6773	P	a-	0.5317	1.8743	0.8902	313.7	186.4	-
29	-20	2565	Sep 11	14:24:12	1755	6996	T	a-	0.4700	1.9902	1.0009	319.7	194.2	4.6
30	-19	2583	Sep 22	21:58:06	1841	7219	T	p-	0.4136	2.0965	1.1015	324.9	200.5	47.9
31	-18	2601	Oct 04	05:36:14	1930	7442	T	p-	0.3614	2.1952	1.1943	329.5	205.6	64.4
32	-17	2619	Oct 15	13:22:29	2021	7665	T	p-	0.3168	2.2802	1.2731	333.3	209.5	74.5
33	-16	2637	Oct 25	21:14:11	2114	7888	T	p-	0.2774	2.3556	1.3424	336.6	212.6	81.5
34	-15	2655	Nov 06	05:13:36	2209	8111	T+	p-	0.2453	2.4175	1.3983	339.4	214.9	86.2
35	-14	2673	Nov 16	13:18:11	2306	8334	T+	p-	0.2182	2.4702	1.4452	342.0	216.8	89.6
36	-13	2691	Nov 27	21:30:20	2406	8557	T+	pp	0.1981	2.5099	1.4793	344.2	218.2	91.8
37	-12	2709	Dec 09	05:46:36	2507	8780	T+	pp	0.1821	2.5418	1.5060	346.2	219.3	93.4
38	-11	2727	Dec 20	14:07:35	2610	9003	T+	pp	0.1710	2.5647	1.5242	348.0	220.3	94.5
39	-10	2745	Dec 30	22:31:19	2716	9226	T+	pp	0.1627	2.5820	1.5372	349.6	221.1	95.3
40	-09	2764	Jan 11	06:57:46	2823	9449	T+	pp	0.1577	2.5929	1.5446	351.1	221.8	95.8
41	-08	2782	Jan 21	15:23:04	2933	9672	T+	pp	0.1521	2.6047	1.5534	352.6	222.5	96.4

42	-07	2800	Feb 01	23:47:11	3045	9895	T+	pp	0.1461	2.6169	1.5632	353.9	223.2	97.0
43	-06	2818	Feb 12	08:07:36	3158	10118	T+	pp	0.1380	2.6328	1.5773	355.3	224.1	97.8
44	-05	2836	Feb 23	16:24:26	3274	10341	T+	pp	0.1276	2.6525	1.5958	356.6	225.0	98.7
45	-04	2854	Mar 06	00:33:07	3392	10564	T+	pp	0.1111	2.6830	1.6256	358.0	226.0	100.0
46	-03	2872	Mar 16	08:35:55	3512	10787	T+	pp	0.0905	2.7211	1.6633	359.3	227.1	101.3
47	-02	2890	Mar 27	16:28:28	3634	11010	T+	pp	0.0619	2.7734	1.7157	360.6	228.2	102.7
48	-01	2908	Apr 08	00:13:40	3758	11233	T+	pp	0.0281	2.8353	1.7778	361.8	229.2	103.8
49	00	2926	Apr 19	07:46:46	3884	11456	T-	pp	-0.0147	2.8598	1.8026	362.7	229.9	104.2
50	01	2944	Apr 29	15:12:15	4013	11679	T-	pp	-0.0632	2.7707	1.7139	363.4	230.1	103.5
51	02	2962	May 10	22:26:26	4143	11902	T-	pp	-0.1203	2.6657	1.6092	363.5	229.5	101.1
52	03	2980	May 21	05:32:38	4275	12125	T-	pp	-0.1833	2.5500	1.4937	362.9	227.8	96.1
53	04	2998	Jun 01	12:29:09	4410	12348	T-	-p	-0.2536	2.4210	1.3646	361.5	224.6	87.2
54	05	3016	Jun 12	19:19:17	4546	12571	T	-t	-0.3285	2.2837	1.2271	359.1	219.8	72.6
55	06	3034	Jun 24	02:02:31	4685	12794	T	-t	-0.4084	2.1374	1.0801	355.5	212.8	45.4
56	07	3052	Jul 04	08:40:31	4825	13017	P	-t	-0.4919	1.9847	0.9264	350.5	203.3	-
57	08	3070	Jul 15	15:15:00	4968	13240	P	-t	-0.5778	1.8278	0.7682	344.1	190.8	-
58	09	3088	Jul 25	21:47:32	5113	13463	P	-t	-0.6647	1.6691	0.6078	336.1	174.7	-
59	10	3106	Aug 07	04:19:34	5260	13686	P	-t	-0.7513	1.5113	0.4478	326.6	154.1	-
60	11	3124	Aug 17	10:52:02	5409	13909	P	-t	-0.8369	1.3556	0.2896	315.6	127.1	-
61	12	3142	Aug 28	17:27:33	5560	14132	P	-t	-0.9194	1.2056	0.1368	303.2	89.4	-
62	13	3160	Sep 08	00:06:25	5713	14355	Nx	-t	-0.9986	1.0618	-0.0101	289.6	-	-
63	14	3178	Sep 19	06:49:55	5868	14578	N	-t	-1.0735	0.9262	-0.1491	274.8	-	-
64	15	3196	Sep 29	13:39:43	6025	14801	N	-t	-1.1426	0.8011	-0.2777	259.3	-	-
65	16	3214	Oct 10	20:37:04	6185	15024	N	-t	-1.2049	0.6886	-0.3938	243.4	-	-
66	17	3232	Oct 21	03:42:42	6346	15247	N	-t	-1.2604	0.5885	-0.4975	227.5	-	-
67	18	3250	Nov 01	10:55:47	6510	15470	N	-t	-1.3095	0.5002	-0.5893	211.8	-	-
68	19	3268	Nov 11	18:18:19	6675	15693	N	-t	-1.3508	0.4262	-0.6666	197.0	-	-
69	20	3286	Nov 23	01:49:05	6843	15916	N	-t	-1.3851	0.3647	-0.7311	183.4	-	-

70	21	3304	Dec 04	09:27:53	7012	16139	N	-t	-1.4129	0.3149	-0.7833	171.3	-	-
71	22	3322	Dec 15	17:13:57	7184	16362	N	-t	-1.4349	0.2757	-0.8247	160.9	-	-
72	23	3340	Dec 26	01:06:24	7358	16585	N	-t	-1.4519	0.2452	-0.8566	152.1	-	-
73	24	3359	Jan 06	09:04:32	7534	16808	N	-t	-1.4644	0.2227	-0.8800	145.2	-	-
74	25	3377	Jan 16	17:04:50	7712	17031	N	-t	-1.4750	0.2032	-0.8995	138.8	-	-
75	26	3395	Jan 28	01:08:46	7892	17254	N	-t	-1.4830	0.1882	-0.9139	133.7	-	-
76	27	3413	Feb 08	09:11:45	8074	17477	N	-t	-1.4915	0.1720	-0.9287	127.8	-	-
77	28	3431	Feb 19	17:14:22	8258	17700	N	-t	-1.5006	0.1542	-0.9444	121.0	-	-
78	29	3449	Mar 02	01:12:08	8445	17923	N	-t	-1.5136	0.1289	-0.9668	110.6	-	-
79	30	3467	Mar 13	09:07:31	8633	18146	N	-t	-1.5285	0.0997	-0.9924	97.4	-	-
80	31	3485	Mar 23	16:56:04	8823	18369	N	-t	-1.5487	0.0605	-1.0276	75.9	-	-
81	32	3503	Apr 05	00:38:36	9016	18592	Ne	-t	-1.5740	0.0120	-1.0716	33.8	-	-

SAROS SERIES

157

Saros series 157 contains 73 lunar eclipses.

PHASE

DURATIONS

SEQ. REL. CALENDAR TD ΔT LUNA ECL. QSE GAMMA PEN. UM. PEN. PAR. TOTAL

NUM.	NUM.	DATE	OF	s	NUM	TYPE	MAG.	MAG.	m	m	m	
GREATEST												
ECLIPSE												
01	-29	2306 Mar 01	13:42:55	735	3786	N t-	-1.5675	0.0238	-1.0597	47.5	-	-
02	-28	2324 Mar 11	21:29:30	792	4009	N t-	-1.5451	0.0645	-1.0182	78.0	-	-
03	-27	2342 Mar 23	05:08:18	851	4232	N t-	-1.5166	0.1161	-0.9654	104.3	-	-
04	-26	2360 Apr 02	12:35:50	912	4455	N t-	-1.4797	0.1831	-0.8970	130.4	-	-
05	-25	2378 Apr 13	19:55:16	975	4678	N t-	-1.4366	0.2615	-0.8170	154.9	-	-
06	-24	2396 Apr 24	03:03:43	1040	4901	N t-	-1.3852	0.3549	-0.7219	179.1	-	-
07	-23	2414 May 05	10:04:13	1108	5124	N t-	-1.3275	0.4600	-0.6152	202.2	-	-
08	-22	2432 May 15	16:54:29	1177	5347	N t-	-1.2616	0.5802	-0.4934	224.6	-	-
09	-21	2450 May 26	23:38:32	1249	5570	N t-	-1.1906	0.7097	-0.3626	245.5	-	-
10	-20	2468 Jun 06	06:15:13	1322	5793	N t-	-1.1139	0.8499	-0.2213	265.1	-	-
11	-19	2486 Jun 17	12:46:55	1398	6016	N t-	-1.0329	0.9982	-0.0722	283.1	-	-
12	-18	2504 Jun 28	19:14:33	1475	6239	P t-	-0.9484	1.1530	0.0831	299.4	70.5	-
13	-17	2522 Jul 10	01:40:39	1555	6462	P t-	-0.8624	1.3106	0.2409	313.8	117.4	-
14	-16	2540 Jul 20	08:06:21	1637	6685	P t-	-0.7756	1.4701	0.4001	326.4	147.7	-
15	-15	2558 Jul 31	14:32:26	1721	6908	P t-	-0.6888	1.6296	0.5590	337.3	170.3	-
16	-14	2576 Aug 10	21:01:26	1807	7131	P t-	-0.6042	1.7854	0.7139	346.4	187.5	-
17	-13	2594 Aug 22	03:34:22	1895	7354	P t-	-0.5225	1.9360	0.8632	353.8	200.7	-
18	-12	2612 Sep 02	10:12:37	1985	7577	T t-	-0.4447	2.0795	1.0052	359.8	210.9	12.0
19	-11	2630 Sep 13	16:57:18	2077	7800	T t-	-0.3718	2.2141	1.1381	364.3	218.5	59.0
20	-10	2648 Sep 23	23:50:09	2172	8023	T t-	-0.3051	2.3373	1.2595	367.7	223.9	77.4
21	-09	2666 Oct 05	06:52:02	2268	8246	T- pp	-0.2457	2.4473	1.3675	370.1	227.7	88.3
22	-08	2684 Oct 15	14:01:43	2366	8469	T- pp	-0.1924	2.5462	1.4645	371.6	230.3	95.2
23	-07	2702 Oct 27	21:21:47	2467	8692	T- pp	-0.1470	2.6304	1.5467	372.5	231.8	99.4
24	-06	2720 Nov 07	04:50:33	2569	8915	T- pp	-0.1083	2.7023	1.6171	372.9	232.6	102.0
25	-05	2738 Nov 18	12:29:42	2674	9138	T- pp	-0.0776	2.7593	1.6726	372.9	232.9	103.3

26	-04	2756	Nov 28	20:15:29	2781	9361	T-	pp	-0.0519	2.8069	1.7193	372.7	232.8	104.0
27	-03	2774	Dec 10	04:10:47	2889	9584	T-	pp	-0.0334	2.8411	1.7531	372.2	232.6	104.2
28	-02	2792	Dec 20	12:11:32	3000	9807	T-	pp	-0.0186	2.8682	1.7803	371.6	232.3	104.2
29	-01	2810	Dec 31	20:18:19	3113	10030	T-	pp	-0.0081	2.8870	1.8000	370.8	231.9	104.1
30	00	2829	Jan 11	04:27:25	3228	10253	T+	pp	0.0011	2.8992	1.8136	369.9	231.5	104.0
31	01	2847	Jan 22	12:39:37	3345	10476	T+	pp	0.0084	2.8845	1.8011	368.8	231.1	103.9
32	02	2865	Feb 01	20:51:00	3464	10699	T+	pp	0.0170	2.8673	1.7868	367.7	230.6	103.7
33	03	2883	Feb 13	05:01:07	3586	10922	T+	pp	0.0274	2.8464	1.7695	366.4	230.2	103.5
34	04	2901	Feb 24	13:07:56	3709	11145	T+	pp	0.0412	2.8191	1.7463	365.0	229.6	103.2
35	05	2919	Mar 07	21:11:15	3834	11368	T+	pp	0.0585	2.7849	1.7170	363.4	229.0	102.8
36	06	2937	Mar 18	05:07:34	3962	11591	T+	pp	0.0821	2.7389	1.6762	361.6	228.2	101.9
37	07	2955	Mar 29	12:58:25	4091	11814	T+	pp	0.1108	2.6835	1.6265	359.6	227.1	100.5
38	08	2973	Apr 08	20:41:47	4223	12037	T+	pp	0.1463	2.6152	1.5642	357.3	225.6	98.1
39	09	2991	Apr 20	04:19:45	4356	12260	T+	pp	0.1872	2.5370	1.4921	354.6	223.6	94.5
40	10	3009	May 01	11:48:35	4492	12483	T+	pp	0.2363	2.4439	1.4052	351.3	220.7	88.7
41	11	3027	May 12	19:13:06	4630	12706	T	-p	0.2897	2.3429	1.3102	347.5	217.0	80.3
42	12	3045	May 23	02:30:11	4770	12929	T	-p	0.3497	2.2297	1.2030	342.9	211.9	67.3
43	13	3063	Jun 03	09:43:41	4912	13152	T	-t	0.4137	2.1094	1.0885	337.6	205.6	46.0
44	14	3081	Jun 13	16:51:18	5056	13375	P	-t	0.4834	1.9788	0.9632	331.2	197.4	-
45	15	3099	Jun 24	23:57:56	5202	13598	P	-t	0.5548	1.8453	0.8347	324.0	187.4	-
46	16	3117	Jul 06	07:01:50	5350	13821	P	-t	0.6288	1.7072	0.7011	315.7	175.2	-
47	17	3135	Jul 17	14:05:45	5500	14044	P	-t	0.7037	1.5677	0.5656	306.4	160.3	-
48	18	3153	Jul 27	21:10:03	5652	14267	P	-t	0.7789	1.4280	0.4294	296.1	142.2	-
49	19	3171	Aug 08	04:17:16	5807	14490	P	-h	0.8523	1.2918	0.2963	284.9	120.1	-
50	20	3189	Aug 18	11:27:46	5963	14713	P	-h	0.9236	1.1598	0.1667	272.8	91.5	-
51	21	3207	Aug 29	18:42:12	6122	14936	P	-h	0.9922	1.0328	0.0417	260.1	46.4	-
52	22	3225	Sep 09	02:02:56	6282	15159	N	-h	1.0562	0.9148	-0.0750	247.0	-	-
53	23	3243	Sep 20	09:29:56	6445	15382	N	-a	1.1156	0.8053	-0.1834	233.6	-	-

54	24	3261	Sep 30	17:04:43	6610	15605	N	-a	1.1693	0.7064	-0.2817	220.2	-	-
55	25	3279	Oct 12	00:47:02	6776	15828	N	-a	1.2175	0.6177	-0.3701	207.2	-	-
56	26	3297	Oct 22	08:38:58	6945	16051	N	-a	1.2588	0.5420	-0.4458	194.9	-	-
57	27	3315	Nov 03	16:39:19	7116	16274	N	-a	1.2938	0.4778	-0.5101	183.7	-	-
58	28	3333	Nov 14	00:47:59	7289	16497	N	-a	1.3229	0.4245	-0.5637	173.5	-	-
59	29	3351	Nov 25	09:05:07	7464	16720	N	-a	1.3461	0.3821	-0.6062	164.9	-	-
60	30	3369	Dec 05	17:30:31	7641	16943	N	-a	1.3635	0.3501	-0.6383	158.0	-	-
61	31	3387	Dec 17	02:02:35	7821	17166	N	-a	1.3762	0.3268	-0.6615	152.6	-	-
62	32	3405	Dec 28	10:40:14	8002	17389	N	-a	1.3851	0.3102	-0.6776	148.6	-	-
63	33	3424	Jan 08	19:22:35	8185	17612	N	-a	1.3910	0.2990	-0.6881	145.7	-	-
64	34	3442	Jan 19	04:08:54	8371	17835	N	-a	1.3946	0.2919	-0.6940	143.7	-	-
65	35	3460	Jan 30	12:55:44	8558	18058	N	-a	1.3982	0.2844	-0.6998	141.7	-	-
66	36	3478	Feb 09	21:43:30	8748	18281	N	-a	1.4016	0.2772	-0.7050	139.7	-	-
67	37	3496	Feb 21	06:28:57	8940	18504	N	-a	1.4074	0.2653	-0.7144	136.5	-	-
68	38	3514	Mar 04	15:12:51	9133	18727	N	-a	1.4148	0.2503	-0.7266	132.5	-	-
69	39	3532	Mar 14	23:50:47	9329	18950	N	-a	1.4276	0.2252	-0.7485	125.7	-	-
70	40	3550	Mar 26	08:25:32	9527	19173	N	-a	1.4433	0.1945	-0.7757	116.9	-	-
71	41	3568	Apr 05	16:52:54	9727	19396	N	-a	1.4654	0.1522	-0.8143	103.6	-	-
72	42	3586	Apr 17	01:14:43	9929	19619	N	-a	1.4923	0.1009	-0.8620	84.6	-	-
73	43	3604	Apr 27	09:28:09	10133	19842	Ne	-a	1.5262	0.0368	-0.9224	51.3	-	-

SAROS SERIES

158

Saros series 158 contains 81 lunar eclipses.

													PHASE	
													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE				MAG.	MAG.	m	m	m
GREATEST														
ECLIPSE														
01	-36	2154 Oct 21 09:26:08	338	1914	Nb t-	1.5560	0.0348	-1.0286	56.4	-	-			
02	-35	2172 Oct 31 17:09:17	378	2137	N h-	1.5197	0.1016	-0.9623	95.5	-	-			
03	-34	2190 Nov 12 01:00:53	419	2360	N h-	1.4894	0.1572	-0.9067	117.9	-	-			
04	-33	2208 Nov 23 09:01:59	463	2583	N h-	1.4659	0.2002	-0.8635	132.2	-	-			
05	-32	2226 Dec 04 17:10:21	509	2806	N h-	1.4479	0.2330	-0.8300	141.8	-	-			
06	-31	2244 Dec 15 01:25:20	557	3029	N a-	1.4340	0.2578	-0.8040	148.4	-	-			
07	-30	2262 Dec 26 09:43:59	607	3252	N a-	1.4226	0.2778	-0.7821	153.3	-	-			
08	-29	2281 Jan 05 18:06:46	659	3475	N a-	1.4136	0.2931	-0.7644	156.7	-	-			
09	-28	2299 Jan 17 02:30:29	713	3698	N a-	1.4048	0.3077	-0.7467	159.8	-	-			
10	-27	2317 Jan 28 10:53:57	769	3921	N a-	1.3953	0.3233	-0.7273	163.0	-	-			
11	-26	2335 Feb 08 19:15:18	827	4144	N a-	1.3834	0.3429	-0.7034	166.9	-	-			
12	-25	2353 Feb 19 03:33:51	888	4367	N a-	1.3686	0.3676	-0.6738	171.7	-	-			
13	-24	2371 Mar 02 11:47:04	950	4590	N a-	1.3489	0.4010	-0.6350	178.0	-	-			
14	-23	2389 Mar 12 19:54:34	1014	4813	N a-	1.3239	0.4441	-0.5863	185.8	-	-			
15	-22	2407 Mar 24 03:55:49	1081	5036	N a-	1.2931	0.4974	-0.5268	194.8	-	-			
16	-21	2425 Apr 03 11:50:58	1149	5259	N a-	1.2568	0.5609	-0.4572	204.7	-	-			
17	-20	2443 Apr 14 19:37:49	1220	5482	N a-	1.2128	0.6385	-0.3734	215.7	-	-			

18	-19	2461	Apr 25	03:19:08	1293	5705	N	a-	1.1634	0.7261	-0.2797	227.0	-	-
19	-18	2479	May 06	10:53:14	1368	5928	N	a-	1.1070	0.8265	-0.1732	238.7	-	-
20	-17	2497	May 16	18:23:08	1444	6151	N	a-	1.0463	0.9350	-0.0590	249.9	-	-
21	-16	2515	May 29	01:46:15	1523	6374	P	a-	0.9791	1.0557	0.0671	261.0	58.4	-
22	-15	2533	Jun 08	09:07:46	1604	6597	P	a-	0.9093	1.1811	0.1975	271.2	98.1	-
23	-14	2551	Jun 19	16:25:17	1688	6820	P	a-	0.8350	1.3153	0.3361	280.7	125.0	-
24	-13	2569	Jun 29	23:42:27	1773	7043	P	a-	0.7595	1.4519	0.4767	289.1	145.4	-
25	-12	2587	Jul 11	06:58:13	1860	7266	P	a-	0.6818	1.5926	0.6208	296.6	161.7	-
26	-11	2605	Jul 22	14:16:22	1949	7489	P	a-	0.6052	1.7318	0.7628	302.9	174.7	-
27	-10	2623	Aug 02	21:35:48	2041	7712	P	a-	0.5288	1.8709	0.9040	308.2	185.1	-
28	-09	2641	Aug 13	04:58:42	2134	7935	T	a-	0.4545	2.0065	1.0412	312.5	193.3	30.6
29	-08	2659	Aug 24	12:25:53	2230	8158	T	a-	0.3831	2.1370	1.1727	315.8	199.6	59.9
30	-07	2677	Sep 03	19:58:59	2327	8381	T	p-	0.3160	2.2598	1.2960	318.3	204.3	75.2
31	-06	2695	Sep 15	03:38:20	2427	8604	T+	p-	0.2537	2.3741	1.4104	320.0	207.6	84.8
32	-05	2713	Sep 26	11:24:41	2529	8827	T+	p-	0.1969	2.4786	1.5145	321.1	209.8	90.9
33	-04	2731	Oct 07	19:19:13	2632	9050	T+	p-	0.1462	2.5719	1.6071	321.7	211.2	94.8
34	-03	2749	Oct 18	03:21:40	2738	9273	T+	p-	0.1018	2.6540	1.6881	321.9	211.9	97.1
35	-02	2767	Oct 29	11:31:52	2846	9496	T+	p-	0.0636	2.7247	1.7577	321.9	212.1	98.3
36	-01	2785	Nov 08	19:50:41	2956	9719	T+	pp	0.0321	2.7830	1.8148	321.7	212.1	98.7
37	00	2803	Nov 20	04:17:09	3068	9942	T+	pp	0.0068	2.8300	1.8606	321.4	211.8	98.7
38	01	2821	Nov 30	12:51:18	3183	10165	T-	pp	-0.0124	2.8203	1.8499	321.1	211.5	98.5
39	02	2839	Dec 11	21:30:26	3299	10388	T-	pp	-0.0278	2.7924	1.8211	320.8	211.2	98.3
40	03	2857	Dec 22	06:16:07	3417	10611	T-	pp	-0.0378	2.7743	1.8025	320.5	210.9	98.0
41	04	2876	Jan 02	15:04:42	3538	10834	T-	pp	-0.0454	2.7606	1.7885	320.2	210.7	97.8
42	05	2894	Jan 12	23:56:21	3660	11057	T-	pp	-0.0507	2.7508	1.7789	319.9	210.5	97.6
43	06	2912	Jan 25	08:47:30	3785	11280	T-	p	-0.0564	2.7401	1.7687	319.6	210.3	97.4
44	07	2930	Feb 04	17:39:03	3911	11503	T-	p	-0.0617	2.7297	1.7594	319.4	210.2	97.3
45	08	2948	Feb 16	02:27:42	4040	11726	T-	p	-0.0695	2.7148	1.7458	319.1	210.1	97.1

46	09	2966	Feb 26	11:12:54	4171	11949	T-	-p	-0.0800	2.6947	1.7275	318.8	209.9	96.8
47	10	2984	Mar 08	19:52:55	4303	12172	T-	-p	-0.0948	2.6664	1.7012	318.4	209.7	96.3
48	11	3002	Mar 21	04:27:30	4438	12395	T-	-p	-0.1143	2.6296	1.6666	318.0	209.4	95.6
49	12	3020	Mar 31	12:55:02	4575	12618	T-	-p	-0.1396	2.5821	1.6214	317.4	208.9	94.3
50	13	3038	Apr 11	21:15:18	4714	12841	T-	-p	-0.1709	2.5233	1.5649	316.6	208.0	92.2
51	14	3056	Apr 22	05:28:11	4855	13064	T-	-p	-0.2085	2.4532	1.4971	315.7	206.8	89.0
52	15	3074	May 03	13:34:09	4999	13287	T-	-p	-0.2519	2.3726	1.4186	314.3	204.9	84.3
53	16	3092	May 13	21:31:39	5144	13510	T	-p	-0.3024	2.2789	1.3267	312.5	202.2	77.1
54	17	3110	May 26	05:23:00	5291	13733	T	-p	-0.3581	2.1761	1.2253	310.2	198.6	66.3
55	18	3128	Jun 05	13:07:05	5441	13956	T	-a	-0.4199	2.0622	1.1124	307.1	193.6	48.6
56	19	3146	Jun 16	20:46:45	5592	14179	P	-a	-0.4849	1.9426	0.9933	303.4	187.3	-
57	20	3164	Jun 27	04:19:42	5746	14402	P	-a	-0.5554	1.8133	0.8640	298.6	178.9	-
58	21	3182	Jul 08	11:50:37	5901	14625	P	-a	-0.6272	1.6819	0.7320	293.0	168.7	-
59	22	3200	Jul 18	19:17:40	6059	14848	P	-a	-0.7021	1.5450	0.5939	286.2	155.6	-
60	23	3218	Jul 30	02:44:01	6219	15071	P	-a	-0.7769	1.4087	0.4558	278.4	139.5	-
61	24	3236	Aug 09	10:08:50	6380	15294	P	-a	-0.8524	1.2713	0.3159	269.4	118.8	-
62	25	3254	Aug 20	17:35:31	6544	15517	P	-a	-0.9257	1.1383	0.1799	259.5	91.6	-
63	26	3272	Aug 31	01:03:41	6710	15740	P	-a	-0.9974	1.0087	0.0467	248.5	47.6	-
64	27	3290	Sep 11	08:34:39	6878	15963	N	-a	-1.0661	0.8846	-0.0815	236.6	-	-
65	28	3308	Sep 22	16:10:01	7048	16186	N	-a	-1.1306	0.7687	-0.2020	224.0	-	-
66	29	3326	Oct 03	23:50:32	7221	16409	N	-a	-1.1901	0.6618	-0.3138	210.8	-	-
67	30	3344	Oct 14	07:37:24	7395	16632	N	-a	-1.2440	0.5655	-0.4153	197.5	-	-
68	31	3362	Oct 25	15:29:43	7571	16855	N	-a	-1.2929	0.4787	-0.5076	183.9	-	-
69	32	3380	Nov 04	23:29:42	7750	17078	N	-a	-1.3350	0.4043	-0.5876	170.9	-	-
70	33	3398	Nov 16	07:35:33	7930	17301	N	-a	-1.3718	0.3396	-0.6578	158.2	-	-
71	34	3416	Nov 27	15:48:29	8113	17524	N	-a	-1.4021	0.2867	-0.7162	146.6	-	-
72	35	3434	Dec 09	00:06:51	8297	17747	N	-a	-1.4275	0.2426	-0.7655	135.9	-	-
73	36	3452	Dec 19	08:31:38	8484	17970	N	-a	-1.4471	0.2092	-0.8038	127.1	-	-

74	37	3470	Dec 30	16:59:57	8673	18193	N	-a	-1.4633	0.1818	-0.8358	119.2	-	-
75	38	3489	Jan 10	01:31:43	8864	18416	N	-a	-1.4762	0.1601	-0.8615	112.5	-	-
76	39	3507	Jan 22	10:05:02	9057	18639	N	-a	-1.4871	0.1419	-0.8833	106.5	-	-
77	40	3525	Feb 01	18:39:25	9252	18862	N	-a	-1.4963	0.1265	-0.9017	101.0	-	-
78	41	3543	Feb 13	03:11:25	9449	19085	N	-a	-1.5071	0.1079	-0.9227	93.8	-	-
79	42	3561	Feb 23	11:41:12	9648	19308	N	-a	-1.5191	0.0870	-0.9456	84.6	-	-
80	43	3579	Mar 06	20:05:54	9849	19531	N	-a	-1.5345	0.0594	-0.9746	70.3	-	-
81	44	3597	Mar 17	04:26:16	10052	19754	N	-a	-1.5528	0.0264	-1.0087	47.1	-	-

SAROS SERIES

159

Saros series 159 contains 73 lunar eclipses.

PHASE													
DURATIONS													
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-39	2147 Sep 09 23:11:33	322	1826	Nb a-	-1.5372	0.0123	-0.9380	29.6	-	-	-	-

02	-38	2165	Sep 20	07:05:16	362	2049	N	a-	-1.4858	0.1074	-0.8447	86.8	-	-
03	-37	2183	Oct 01	15:05:25	403	2272	N	a-	-1.4396	0.1933	-0.7610	115.5	-	-
04	-36	2201	Oct 12	23:14:05	446	2495	N	a-	-1.4001	0.2669	-0.6897	134.9	-	-
05	-35	2219	Oct 24	07:29:32	491	2718	N	a-	-1.3663	0.3303	-0.6288	149.2	-	-
06	-34	2237	Nov 03	15:53:39	538	2941	N	a-	-1.3394	0.3809	-0.5807	159.5	-	-
07	-33	2255	Nov 15	00:24:34	587	3164	N	a-	-1.3181	0.4213	-0.5429	167.2	-	-
08	-32	2273	Nov 25	09:01:53	638	3387	N	a-	-1.3020	0.4520	-0.5144	172.7	-	-
09	-31	2291	Dec 06	17:45:10	691	3610	N	a-	-1.2908	0.4735	-0.4951	176.6	-	-
10	-30	2309	Dec 18	02:32:41	747	3833	N	a-	-1.2830	0.4888	-0.4815	179.3	-	-
11	-29	2327	Dec 29	11:23:32	804	4056	N	a-	-1.2784	0.4978	-0.4739	180.9	-	-
12	-28	2346	Jan 08	20:14:46	863	4279	N	a-	-1.2743	0.5059	-0.4667	182.4	-	-
13	-27	2364	Jan 20	05:07:05	925	4502	N	a-	-1.2715	0.5114	-0.4618	183.4	-	-
14	-26	2382	Jan 30	13:57:10	989	4725	N	a-	-1.2668	0.5200	-0.4533	185.0	-	-
15	-25	2400	Feb 10	22:44:27	1054	4948	N	a-	-1.2606	0.5313	-0.4417	187.0	-	-
16	-24	2418	Feb 21	07:26:24	1122	5171	N	a-	-1.2504	0.5496	-0.4228	190.0	-	-
17	-23	2436	Mar 03	16:03:14	1192	5394	N	a-	-1.2367	0.5745	-0.3972	194.0	-	-
18	-22	2454	Mar 15	00:33:02	1264	5617	N	a-	-1.2176	0.6089	-0.3617	199.3	-	-
19	-21	2472	Mar 25	08:55:10	1338	5840	N	a-	-1.1927	0.6540	-0.3155	205.9	-	-
20	-20	2490	Apr 05	17:09:28	1414	6063	N	a-	-1.1619	0.7100	-0.2584	213.7	-	-
21	-19	2508	Apr 17	01:15:51	1492	6286	N	a-	-1.1252	0.7768	-0.1907	222.4	-	-
22	-18	2526	Apr 28	09:13:29	1572	6509	N	a-	-1.0819	0.8560	-0.1107	232.0	-	-
23	-17	2544	May 08	17:03:20	1655	6732	N	a-	-1.0325	0.9464	-0.0198	242.2	-	-
24	-16	2562	May 20	00:45:23	1739	6955	P	a-	-0.9772	1.0477	0.0816	252.6	62.7	-
25	-15	2580	May 30	08:21:38	1825	7178	P	a-	-0.9176	1.1573	0.1908	263.0	94.7	-
26	-14	2598	Jun 10	15:50:01	1914	7401	P	a-	-0.8521	1.2778	0.3105	273.5	119.1	-
27	-13	2616	Jun 21	23:14:53	2004	7624	P	a-	-0.7845	1.4027	0.4340	283.3	138.6	-
28	-12	2634	Jul 03	06:34:23	2097	7847	P	a-	-0.7131	1.5348	0.5640	292.7	155.3	-
29	-11	2652	Jul 13	13:52:27	2192	8070	P	a-	-0.6410	1.6683	0.6951	301.3	169.3	-

30	-10	2670	Jul 24	21:06:28	2288	8293	P a-	-0.5663	1.8070	0.8306	309.3	181.4	-
31	-09	2688	Aug 04	04:22:03	2387	8516	P a-	-0.4936	1.9422	0.9620	316.3	191.4	-
32	-08	2706	Aug 16	11:37:00	2488	8739	T a-	-0.4214	2.0768	1.0924	322.5	199.6	45.8
33	-07	2724	Aug 26	18:54:49	2591	8962	T p-	-0.3524	2.2059	1.2168	327.9	206.3	67.5
34	-06	2742	Sep 07	02:14:46	2696	9185	T p-	-0.2857	2.3309	1.3365	332.5	211.5	80.9
35	-05	2760	Sep 17	09:40:35	2803	9408	T- pp	-0.2246	2.4458	1.4459	336.3	215.5	89.5
36	-04	2778	Sep 28	17:10:59	2913	9631	T- pp	-0.1682	2.5523	1.5464	339.6	218.4	95.2
37	-03	2796	Oct 09	00:47:09	3024	9854	T- pp	-0.1173	2.6487	1.6368	342.3	220.5	98.8
38	-02	2814	Oct 20	08:29:42	3137	10077	T- pp	-0.0725	2.7340	1.7158	344.7	222.0	100.9
39	-01	2832	Oct 30	16:19:38	3253	10300	T- pp	-0.0344	2.8072	1.7828	346.7	222.9	101.9
40	00	2850	Nov 11	00:15:59	3370	10523	T- pp	-0.0023	2.8692	1.8387	348.5	223.5	102.2
41	01	2868	Nov 21	08:18:53	3490	10746	T+ pp	0.0238	2.8326	1.7963	350.1	224.0	102.1
42	02	2886	Dec 02	16:27:49	3611	10969	T+ pp	0.0441	2.7981	1.7563	351.6	224.3	101.8
43	03	2904	Dec 14	00:42:23	3735	11192	T+ pp	0.0592	2.7730	1.7261	353.1	224.6	101.5
44	04	2922	Dec 25	08:59:41	3861	11415	T+ pp	0.0713	2.7532	1.7017	354.5	224.9	101.2
45	05	2941	Jan 04	17:20:48	3989	11638	T+ pp	0.0797	2.7398	1.6843	355.8	225.3	100.9
46	06	2959	Jan 16	01:42:19	4119	11861	T+ pp	0.0872	2.7278	1.6688	357.1	225.7	100.7
47	07	2977	Jan 26	10:04:13	4251	12084	T+ pp	0.0936	2.7173	1.6556	358.3	226.1	100.6
48	08	2995	Feb 06	18:22:27	4385	12307	T+ pp	0.1025	2.7020	1.6382	359.4	226.4	100.3
49	09	3013	Feb 18	02:38:44	4521	12530	T+ pp	0.1125	2.6845	1.6193	360.3	226.7	99.9
50	10	3031	Mar 01	10:48:54	4659	12753	T+ pp	0.1271	2.6581	1.5919	361.1	226.8	99.2
51	11	3049	Mar 11	18:52:54	4799	12976	T+ pp	0.1461	2.6235	1.5569	361.7	226.8	98.0
52	12	3067	Mar 23	02:48:28	4942	13199	T+ -p	0.1714	2.5770	1.5103	362.0	226.4	96.1
53	13	3085	Apr 02	10:36:16	5086	13422	T+ -p	0.2026	2.5197	1.4534	362.0	225.6	93.0
54	14	3103	Apr 14	18:14:37	5233	13645	T+ -p	0.2411	2.4488	1.3830	361.6	224.1	88.2
55	15	3121	Apr 25	01:43:02	5381	13868	T -p	0.2871	2.3641	1.2989	360.5	221.7	80.7
56	16	3139	May 06	09:02:08	5532	14091	T -t	0.3401	2.2665	1.2020	358.8	218.2	68.8
57	17	3157	May 16	16:11:44	5685	14314	T -t	0.3998	2.1565	1.0927	356.1	213.1	48.4

58	18	3175	May 27	23:12:05	5840	14537	P	-t	0.4666	2.0338	0.9705	352.3	206.0	-
59	19	3193	Jun 07	06:04:16	5996	14760	P	-t	0.5394	1.9000	0.8371	347.2	196.4	-
60	20	3211	Jun 18	12:49:21	6155	14983	P	-t	0.6170	1.7575	0.6946	340.7	183.7	-
61	21	3229	Jun 28	19:29:12	6316	15206	P	-t	0.6981	1.6088	0.5456	332.5	167.2	-
62	22	3247	Jul 10	02:02:58	6479	15429	P	-t	0.7833	1.4528	0.3890	322.4	144.9	-
63	23	3265	Jul 20	08:34:58	6645	15652	P	-t	0.8690	1.2961	0.2313	310.5	114.6	-
64	24	3283	Jul 31	15:04:21	6812	15875	P	-t	0.9559	1.1373	0.0712	296.5	65.1	-
65	25	3301	Aug 11	21:34:51	6981	16098	N	-t	1.0414	0.9812	-0.0866	280.4	-	-
66	26	3319	Aug 23	04:05:10	7152	16321	N	-t	1.1263	0.8265	-0.2433	261.9	-	-
67	27	3337	Sep 02	10:40:09	7326	16544	N	-t	1.2068	0.6800	-0.3922	241.4	-	-
68	28	3355	Sep 13	17:18:40	7501	16767	N	-t	1.2836	0.5404	-0.5345	218.4	-	-
69	29	3373	Sep 24	00:03:06	7679	16990	N	-t	1.3552	0.4104	-0.6673	192.8	-	-
70	30	3391	Oct 05	06:54:04	7859	17213	N	-t	1.4213	0.2907	-0.7900	164.2	-	-
71	31	3409	Oct 16	13:53:32	8040	17436	N	-t	1.4803	0.1839	-0.8998	132.0	-	-
72	32	3427	Oct 27	21:01:22	8224	17659	N	-t	1.5322	0.0902	-0.9966	93.3	-	-
73	33	3445	Nov 07	04:16:35	8410	17882	Ne	-t	1.5780	0.0076	-1.0821	27.3	-	-

SAROS SERIES

160

Saros series 160 contains 72 lunar eclipses.

													PHASE
													DURATIONS
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-33	2248 Oct 03 15:52:04	567	3076	Nb t-	1.5365	0.0611	-0.9836	73.3	-	-		
02	-32	2266 Oct 14 23:23:02	618	3299	N t-	1.4969	0.1369	-0.9139	109.4	-	-		
03	-31	2284 Oct 25 07:01:35	670	3522	N t-	1.4633	0.2016	-0.8553	132.6	-	-		
04	-30	2302 Nov 06 14:46:26	724	3745	N t-	1.4353	0.2560	-0.8068	149.3	-	-		
05	-29	2320 Nov 16 22:38:58	781	3968	N t-	1.4138	0.2982	-0.7701	161.1	-	-		
06	-28	2338 Nov 28 06:37:25	840	4191	N t-	1.3976	0.3305	-0.7428	169.7	-	-		
07	-27	2356 Dec 08 14:40:36	900	4414	N t-	1.3857	0.3546	-0.7232	176.0	-	-		
08	-26	2374 Dec 19 22:47:53	963	4637	N t-	1.3775	0.3715	-0.7103	180.5	-	-		
09	-25	2392 Dec 30 06:57:20	1028	4860	N t-	1.3717	0.3838	-0.7011	183.8	-	-		
10	-24	2411 Jan 10 15:08:15	1095	5083	N t-	1.3675	0.3928	-0.6946	186.2	-	-		
11	-23	2429 Jan 20 23:16:44	1164	5306	N t-	1.3620	0.4038	-0.6854	189.1	-	-		
12	-22	2447 Feb 01 07:24:27	1235	5529	N t-	1.3562	0.4148	-0.6754	191.8	-	-		
13	-21	2465 Feb 11 15:26:51	1308	5752	N t-	1.3470	0.4319	-0.6587	195.8	-	-		
14	-20	2483 Feb 22 23:24:23	1384	5975	N t-	1.3340	0.4557	-0.6346	201.0	-	-		
15	-19	2501 Mar 06 07:13:33	1461	6198	N t-	1.3146	0.4909	-0.5985	208.2	-	-		
16	-18	2519 Mar 17 14:56:26	1540	6421	N t-	1.2905	0.5344	-0.5537	216.6	-	-		
17	-17	2537 Mar 27 22:29:42	1622	6644	N t-	1.2589	0.5915	-0.4949	226.8	-	-		
18	-16	2555 Apr 08 05:53:58	1705	6867	N t-	1.2203	0.6615	-0.4230	238.4	-	-		
19	-15	2573 Apr 18 13:08:28	1791	7090	N t-	1.1738	0.7457	-0.3367	251.2	-	-		
20	-14	2591 Apr 29 20:14:12	1879	7313	N t-	1.1201	0.8432	-0.2371	264.6	-	-		
21	-13	2609 May 11 03:10:50	1968	7536	N t-	1.0591	0.9539	-0.1241	278.4	-	-		

22	-12	2627	May 22	09:59:12	2060	7759	P	t-	0.9914	1.0771	0.0011	292.1	8.0	-
23	-11	2645	Jun 01	16:40:36	2154	7982	P	t-	0.9179	1.2111	0.1369	305.2	89.8	-
24	-10	2663	Jun 12	23:16:24	2250	8205	P	t-	0.8395	1.3542	0.2816	317.7	126.1	-
25	-09	2681	Jun 23	05:46:34	2348	8428	P	t-	0.7562	1.5062	0.4350	329.1	153.2	-
26	-08	2699	Jul 04	12:14:28	2448	8651	P	t-	0.6708	1.6625	0.5922	339.3	174.3	-
27	-07	2717	Jul 15	18:39:40	2550	8874	P	t-	0.5828	1.8237	0.7541	348.2	191.3	-
28	-06	2735	Jul 27	01:06:30	2655	9097	P	t-	0.4956	1.9835	0.9141	355.6	204.7	-
29	-05	2753	Aug 06	07:32:44	2761	9320	T	t-	0.4075	2.1452	1.0757	361.6	215.2	44.6
30	-04	2771	Aug 17	14:04:20	2869	9543	T	t-	0.3232	2.3001	1.2302	366.2	223.0	73.8
31	-03	2789	Aug 27	20:38:53	2980	9766	T+	pp	0.2408	2.4518	1.3811	369.5	228.5	89.7
32	-02	2807	Sep 08	03:21:14	3092	9989	T+	pp	0.1643	2.5926	1.5210	371.5	232.0	98.8
33	-01	2825	Sep 18	10:09:06	3207	10212	T+	pp	0.0918	2.7262	1.6533	372.6	233.9	103.7
34	00	2843	Sep 29	17:07:01	3324	10435	T+	pp	0.0270	2.8459	1.7717	372.8	234.5	105.6
35	01	2861	Oct 10	00:12:28	3442	10658	T-	pp	-0.0322	2.8371	1.7613	372.4	234.0	105.2
36	02	2879	Oct 21	07:27:46	3563	10881	T-	pp	-0.0838	2.7431	1.6660	371.5	232.9	103.4
37	03	2897	Oct 31	14:52:00	3686	11104	T-	pp	-0.1285	2.6618	1.5833	370.3	231.3	100.6
38	04	2915	Nov 12	22:26:46	3811	11327	T-	pp	-0.1646	2.5961	1.5165	368.9	229.6	97.4
39	05	2933	Nov 23	06:10:08	3938	11550	T-	pp	-0.1945	2.5417	1.4612	367.5	227.8	94.1
40	06	2951	Dec 04	14:01:47	4067	11773	T-	pp	-0.2179	2.4989	1.4179	366.1	226.1	91.0
41	07	2969	Dec 14	22:00:51	4198	11996	T-	pp	-0.2358	2.4661	1.3852	364.7	224.7	88.3
42	08	2987	Dec 26	06:06:34	4332	12219	T-	pp	-0.2484	2.4426	1.3623	363.4	223.5	86.3
43	09	3006	Jan 06	14:16:17	4467	12442	T-	-p	-0.2584	2.4237	1.3447	362.1	222.4	84.6
44	10	3024	Jan 17	22:29:43	4604	12665	T-	-p	-0.2657	2.4093	1.3322	360.7	221.5	83.3
45	11	3042	Jan 28	06:44:20	4744	12888	T	-p	-0.2728	2.3950	1.3205	359.3	220.6	82.0
46	12	3060	Feb 08	14:59:46	4885	13111	T	-p	-0.2797	2.3807	1.3094	357.8	219.7	80.8
47	13	3078	Feb 18	23:12:07	5029	13334	T	-p	-0.2897	2.3603	1.2930	356.0	218.6	79.0
48	14	3096	Mar 01	07:22:49	5175	13557	T	-p	-0.3018	2.3358	1.2730	354.0	217.3	76.7
49	15	3114	Mar 13	15:28:11	5322	13780	T	-p	-0.3188	2.3021	1.2444	351.7	215.7	73.2

50	16	3132	Mar 23	23:28:37	5472	14003	T	-p	-0.3407	2.2592	1.2070	349.1	213.5	68.1
51	17	3150	Apr 04	07:21:47	5624	14226	T	-p	-0.3692	2.2039	1.1575	345.9	210.7	60.3
52	18	3168	Apr 14	15:09:27	5778	14449	T	-p	-0.4030	2.1389	1.0986	342.3	207.1	48.5
53	19	3186	Apr 25	22:49:53	5934	14672	T	-t	-0.4433	2.0617	1.0275	338.0	202.5	26.2
54	20	3204	May 06	06:23:07	6092	14895	P	-t	-0.4904	1.9722	0.9443	333.0	196.6	-
55	21	3222	May 17	13:50:12	6253	15118	P	-t	-0.5433	1.8721	0.8502	327.2	189.1	-
56	22	3240	May 27	21:11:30	6415	15341	P	-t	-0.6018	1.7616	0.7457	320.3	179.8	-
57	23	3258	Jun 08	04:28:16	6579	15564	P	-t	-0.6647	1.6435	0.6332	312.5	168.3	-
58	24	3276	Jun 18	11:40:21	6746	15787	P	-t	-0.7321	1.5171	0.5121	303.4	153.8	-
59	25	3294	Jun 29	18:50:47	6914	16010	P	-t	-0.8018	1.3868	0.3866	293.3	135.8	-
60	26	3312	Jul 11	01:59:31	7085	16233	P	-t	-0.8738	1.2525	0.2567	281.8	112.4	-
61	27	3330	Jul 22	09:07:56	7257	16456	P	-h	-0.9468	1.1166	0.1246	268.9	79.5	-
62	28	3348	Aug 01	16:17:22	7432	16679	N	-h	-1.0196	0.9814	-0.0073	254.8	-	-
63	29	3366	Aug 12	23:29:11	7609	16902	N	-h	-1.0912	0.8486	-0.1373	239.3	-	-
64	30	3384	Aug 23	06:45:12	7788	17125	N	-h	-1.1600	0.7211	-0.2626	222.6	-	-
65	31	3402	Sep 04	14:04:51	7968	17348	N	-a	-1.2267	0.5980	-0.3840	204.5	-	-
66	32	3420	Sep 14	21:31:16	8151	17571	N	-a	-1.2884	0.4841	-0.4967	185.5	-	-
67	33	3438	Sep 26	05:03:44	8337	17794	N	-a	-1.3459	0.3783	-0.6019	165.1	-	-
68	34	3456	Oct 06	12:44:12	8524	18017	N	-a	-1.3973	0.2837	-0.6960	143.8	-	-
69	35	3474	Oct 17	20:31:50	8713	18240	N	-a	-1.4436	0.1989	-0.7809	121.0	-	-
70	36	3492	Oct 28	04:28:20	8904	18463	N	-a	-1.4834	0.1259	-0.8540	96.7	-	-
71	37	3510	Nov 09	12:33:10	9097	18686	N	-a	-1.5171	0.0643	-0.9160	69.3	-	-
72	38	3528	Nov 19	20:45:41	9293	18909	N	-a	-1.5452	0.0129	-0.9679	31.1	-	-

SAROS SERIES

161

Saros series 161 contains 73 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-35	2259 Sep 02 14:47:56	597	3211	Nb t-	-1.5668	0.0099	-1.0435	30.2	-	-	-	-	-
02	-34	2277 Sep 12 21:49:40	649	3434	N t-	-1.4999	0.1328	-0.9207	109.1	-	-	-	-	-
03	-33	2295 Sep 24 05:00:02	703	3657	N t-	-1.4387	0.2450	-0.8086	146.4	-	-	-	-	-
04	-32	2313 Oct 05 12:20:12	758	3880	N t-	-1.3843	0.3451	-0.7088	171.6	-	-	-	-	-
05	-31	2331 Oct 16 19:49:56	816	4103	N t-	-1.3365	0.4329	-0.6213	190.2	-	-	-	-	-
06	-30	2349 Oct 27 03:30:27	876	4326	N h-	-1.2963	0.5069	-0.5476	203.8	-	-	-	-	-
07	-29	2367 Nov 07 11:20:25	938	4549	N h-	-1.2630	0.5678	-0.4867	213.8	-	-	-	-	-
08	-28	2385 Nov 17 19:18:57	1002	4772	N h-	-1.2358	0.6177	-0.4366	221.3	-	-	-	-	-
09	-27	2403 Nov 29 03:25:44	1068	4995	N a-	-1.2145	0.6565	-0.3973	226.6	-	-	-	-	-
10	-26	2421 Dec 09 11:40:03	1137	5218	N a-	-1.1984	0.6857	-0.3671	230.3	-	-	-	-	-
11	-25	2439 Dec 20 19:59:36	1207	5441	N a-	-1.1858	0.7079	-0.3434	232.7	-	-	-	-	-
12	-24	2457 Dec 31 04:23:20	1279	5664	N a-	-1.1759	0.7250	-0.3242	234.3	-	-	-	-	-
13	-23	2476 Jan 11 12:49:31	1354	5887	N a-	-1.1672	0.7397	-0.3068	235.5	-	-	-	-	-

14	-22	2494	Jan 21	21:17:45	1430	6110	N	a-	-1.1593	0.7525	-0.2908	236.4	-	-
15	-21	2512	Feb 03	05:43:56	1509	6333	N	a-	-1.1489	0.7695	-0.2698	237.7	-	-
16	-20	2530	Feb 13	14:09:12	1589	6556	N	a-	-1.1371	0.7891	-0.2459	239.3	-	-
17	-19	2548	Feb 24	22:29:44	1672	6779	N	a-	-1.1206	0.8168	-0.2131	241.8	-	-
18	-18	2566	Mar 07	06:46:52	1757	7002	N	a-	-1.1006	0.8507	-0.1738	244.9	-	-
19	-17	2584	Mar 17	14:56:25	1844	7225	N	a-	-1.0736	0.8975	-0.1213	249.3	-	-
20	-16	2602	Mar 29	23:01:38	1933	7448	N	a-	-1.0422	0.9520	-0.0609	254.2	-	-
21	-15	2620	Apr 09	06:58:47	2024	7671	P	a-	-1.0036	1.0199	0.0130	260.0	26.0	-
22	-14	2638	Apr 20	14:49:41	2117	7894	P	a-	-0.9590	1.0986	0.0978	266.4	70.4	-
23	-13	2656	Apr 30	22:32:51	2212	8117	P	a-	-0.9076	1.1901	0.1952	273.3	97.8	-
24	-12	2674	May 12	06:11:01	2309	8340	P	a-	-0.8512	1.2906	0.3014	280.2	119.3	-
25	-11	2692	May 22	13:43:08	2408	8563	P	a-	-0.7889	1.4021	0.4184	287.1	137.7	-
26	-10	2710	Jun 03	21:10:23	2510	8786	P	a-	-0.7219	1.5225	0.5439	293.7	153.6	-
27	-09	2728	Jun 14	04:34:21	2613	9009	P	a-	-0.6514	1.6496	0.6755	299.8	167.2	-
28	-08	2746	Jun 25	11:55:59	2719	9232	P	a-	-0.5784	1.7815	0.8114	305.3	178.6	-
29	-07	2764	Jul 05	19:15:49	2826	9455	P	a-	-0.5030	1.9180	0.9515	310.0	188.3	-
30	-06	2782	Jul 17	02:35:28	2936	9678	T	a-	-0.4266	2.0567	1.0932	314.0	196.2	45.2
31	-05	2800	Jul 27	09:56:36	3048	9901	T	a-	-0.3507	2.1949	1.2337	317.1	202.3	68.4
32	-04	2818	Aug 07	17:20:37	3161	10124	T	p-	-0.2767	2.3297	1.3702	319.4	206.9	82.0
33	-03	2836	Aug 18	00:46:58	3277	10347	T-	p-	-0.2040	2.4626	1.5043	320.9	210.1	90.7
34	-02	2854	Aug 29	08:19:05	3395	10570	T-	p-	-0.1357	2.5877	1.6300	321.8	212.1	96.0
35	-01	2872	Sep 08	15:55:59	3515	10793	T-	pp	-0.0708	2.7068	1.7491	322.0	213.0	98.8
36	00	2890	Sep 19	23:40:17	3637	11016	T-	pp	-0.0118	2.8153	1.8572	321.8	213.1	99.7
37	01	2908	Oct 01	07:29:50	3761	11239	T+	pp	0.0432	2.7579	1.7990	321.2	212.5	99.1
38	02	2926	Oct 12	15:28:29	3888	11462	T+	pp	0.0907	2.6714	1.7113	320.4	211.5	97.5
39	03	2944	Oct 22	23:33:47	4016	11685	T+	-p	0.1330	2.5945	1.6330	319.4	210.2	95.2
40	04	2962	Nov 03	07:47:44	4146	11908	T+	-p	0.1683	2.5305	1.5675	318.4	208.8	92.5
41	05	2980	Nov 13	16:08:41	4279	12131	T+	-p	0.1980	2.4768	1.5122	317.5	207.4	89.8

42	06	2998	Nov 25	00:38:12	4413	12354	T+	-p	0.2210	2.4354	1.4693	316.7	206.2	87.3
43	07	3016	Dec 06	09:13:42	4550	12577	T+	-p	0.2390	2.4031	1.4355	316.0	205.1	85.1
44	08	3034	Dec 17	17:54:52	4689	12800	T+	-p	0.2526	2.3787	1.4099	315.4	204.2	83.3
45	09	3052	Dec 28	02:40:57	4829	13023	T+	-p	0.2625	2.3611	1.3914	315.0	203.5	81.9
46	10	3071	Jan 08	11:30:55	4972	13246	T+	-p	0.2696	2.3482	1.3779	314.7	203.0	80.8
47	11	3089	Jan 18	20:22:28	5117	13469	T	-p	0.2755	2.3375	1.3671	314.4	202.6	79.9
48	12	3107	Jan 31	05:14:19	5264	13692	T	-p	0.2813	2.3267	1.3565	314.1	202.3	79.1
49	13	3125	Feb 10	14:05:13	5413	13915	T	-p	0.2881	2.3139	1.3443	313.8	201.9	78.1
50	14	3143	Feb 21	22:54:07	5564	14138	T	-p	0.2968	2.2974	1.3289	313.4	201.4	76.8
51	15	3161	Mar 04	07:38:02	5717	14361	T	-p	0.3097	2.2731	1.3061	312.8	200.7	74.7
52	16	3179	Mar 15	16:17:30	5872	14584	T	-p	0.3262	2.2419	1.2765	312.1	199.7	71.8
53	17	3197	Mar 26	00:50:09	6030	14807	T	-p	0.3483	2.2005	1.2368	311.1	198.3	67.4
54	18	3215	Apr 06	09:16:35	6189	15030	T	-p	0.3755	2.1497	1.1879	309.8	196.4	61.0
55	19	3233	Apr 16	17:34:20	6351	15253	T	-a	0.4099	2.0856	1.1257	308.0	193.7	51.0
56	20	3251	Apr 28	01:45:29	6514	15476	T	-a	0.4496	2.0118	1.0538	305.8	190.2	34.1
57	21	3269	May 08	09:48:19	6680	15699	P	-a	0.4960	1.9259	0.9694	302.9	185.5	-
58	22	3287	May 19	17:43:43	6847	15922	P	-a	0.5484	1.8290	0.8738	299.3	179.3	-
59	23	3305	May 31	01:31:45	7017	16145	P	-a	0.6067	1.7216	0.7674	294.7	171.4	-
60	24	3323	Jun 11	09:13:51	7189	16368	P	-a	0.6696	1.6060	0.6523	289.2	161.3	-
61	25	3341	Jun 21	16:50:35	7363	16591	P	-a	0.7367	1.4828	0.5290	282.6	148.4	-
62	26	3359	Jul 03	00:21:44	7539	16814	P	-a	0.8080	1.3522	0.3979	274.6	131.5	-
63	27	3377	Jul 13	07:50:13	7717	17037	P	-a	0.8809	1.2190	0.2636	265.4	109.4	-
64	28	3395	Jul 24	15:15:26	7897	17260	P	-a	0.9559	1.0823	0.1252	254.5	77.0	-
65	29	3413	Aug 04	22:39:35	8079	17483	N	-a	1.0311	0.9455	-0.0140	242.1	-	-
66	30	3431	Aug 16	06:02:30	8263	17706	N	-a	1.1067	0.8082	-0.1542	227.8	-	-
67	31	3449	Aug 26	13:27:25	8450	17929	N	-a	1.1798	0.6758	-0.2901	211.8	-	-
68	32	3467	Sep 06	20:53:57	8638	18152	N	-a	1.2506	0.5480	-0.4219	193.8	-	-
69	33	3485	Sep 17	04:23:16	8828	18375	N	-a	1.3183	0.4261	-0.5483	173.5	-	-

70	34	3503	Sep 29	11:57:03	9021	18598	N	-a	1.3815	0.3125	-0.6668	150.8	-	-
71	35	3521	Oct 09	19:35:57	9216	18821	N	-a	1.4399	0.2081	-0.7765	124.7	-	-
72	36	3539	Oct 21	03:20:42	9412	19044	N	-a	1.4927	0.1140	-0.8762	93.5	-	-
73	37	3557	Oct 31	11:10:59	9611	19267	Ne	-a	1.5403	0.0295	-0.9664	48.1	-	-

SAROS SERIES

162

Saros series 162 contains 71 lunar eclipses.

													PHASE	
													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-37	2288 Aug 12	20:15:31	681	3569	Nb a-	1.4946	0.0875	-0.8572	78.4	-	-		
02	-36	2306 Aug 25	03:53:23	736	3792	N a-	1.4297	0.2071	-0.7385	119.3	-	-		
03	-35	2324 Sep 04	11:36:05	793	4015	N a-	1.3683	0.3205	-0.6266	146.8	-	-		
04	-34	2342 Sep 15	19:24:22	852	4238	N a-	1.3113	0.4261	-0.5229	167.6	-	-		
05	-33	2360 Sep 26	03:19:54	914	4461	N a-	1.2602	0.5211	-0.4303	183.7	-	-		

06	-32	2378	Oct 07	11:22:21	977	4684	N	a-	1.2148	0.6057	-0.3484	196.5	-	-
07	-31	2396	Oct 17	19:32:43	1042	4907	N	a-	1.1760	0.6783	-0.2786	206.6	-	-
08	-30	2414	Oct 29	03:49:51	1109	5130	N	a-	1.1430	0.7403	-0.2195	214.7	-	-
09	-29	2432	Nov 08	12:15:14	1179	5353	N	a-	1.1169	0.7899	-0.1730	220.8	-	-
10	-28	2450	Nov 19	20:46:40	1250	5576	N	a-	1.0959	0.8297	-0.1360	225.6	-	-
11	-27	2468	Nov 30	05:24:27	1324	5799	N	a-	1.0806	0.8593	-0.1092	229.2	-	-
12	-26	2486	Dec 11	14:07:10	1400	6022	N	a-	1.0694	0.8809	-0.0900	231.8	-	-
13	-25	2504	Dec 22	22:54:41	1478	6245	N	a-	1.0627	0.8943	-0.0787	233.5	-	-
14	-24	2523	Jan 03	07:44:09	1557	6468	N	a-	1.0579	0.9041	-0.0706	234.9	-	-
15	-23	2541	Jan 13	16:35:03	1639	6691	N	a-	1.0544	0.9111	-0.0649	235.9	-	-
16	-22	2559	Jan 25	01:25:29	1723	6914	N	a-	1.0511	0.9176	-0.0592	236.9	-	-
17	-21	2577	Feb 04	10:14:49	1809	7137	N	a-	1.0475	0.9244	-0.0529	238.0	-	-
18	-20	2595	Feb 15	18:59:22	1897	7360	N	a-	1.0403	0.9376	-0.0397	239.7	-	-
19	-19	2613	Feb 27	03:40:03	1988	7583	N	a-	1.0305	0.9555	-0.0216	241.9	-	-
20	-18	2631	Mar 10	12:13:33	2080	7806	P	a-	1.0154	0.9830	0.0065	245.0	17.7	-
21	-17	2649	Mar 20	20:41:39	2174	8029	P	a-	0.9964	1.0174	0.0415	248.8	44.7	-
22	-16	2667	Apr 01	04:59:45	2270	8252	P	a-	0.9700	1.0655	0.0903	253.8	65.7	-
23	-15	2685	Apr 11	13:11:29	2369	8475	P	a-	0.9389	1.1222	0.1478	259.4	83.5	-
24	-14	2703	Apr 23	21:12:57	2470	8698	P	a-	0.8998	1.1937	0.2199	266.0	101.0	-
25	-13	2721	May 04	05:07:36	2572	8921	P	a-	0.8558	1.2743	0.3008	272.9	117.1	-
26	-12	2739	May 15	12:52:11	2677	9144	P	a-	0.8039	1.3694	0.3960	280.6	132.8	-
27	-11	2757	May 25	20:31:07	2784	9367	P	a-	0.7479	1.4723	0.4986	288.3	147.1	-
28	-10	2775	Jun 06	04:01:54	2892	9590	P	a-	0.6856	1.5871	0.6126	296.1	160.6	-
29	-09	2793	Jun 16	11:27:20	3003	9813	P	a-	0.6193	1.7093	0.7336	303.6	172.9	-
30	-08	2811	Jun 27	18:46:47	3116	10036	P	a-	0.5485	1.8401	0.8626	310.9	183.9	-
31	-07	2829	Jul 08	02:03:07	3231	10259	P	a-	0.4755	1.9752	0.9954	317.6	193.5	-
32	-06	2847	Jul 19	09:16:19	3348	10482	T	p-	0.4007	2.1139	1.1312	323.6	201.7	53.9
33	-05	2865	Jul 29	16:27:39	3468	10705	T	p-	0.3250	2.2547	1.2685	329.0	208.5	73.9

34	-04	2883	Aug 09	23:39:02	3589	10928	T+	pp	0.2499	2.3944	1.4042	333.5	213.9	86.6
35	-03	2901	Aug 21	06:51:31	3712	11151	T+	pp	0.1763	2.5318	1.5371	337.3	217.9	94.8
36	-02	2919	Sep 01	14:05:41	3838	11374	T+	pp	0.1051	2.6649	1.6652	340.4	220.6	99.8
37	-01	2937	Sep 11	21:23:18	3965	11597	T+	pp	0.0376	2.7916	1.7865	342.7	222.2	102.2
38	00	2955	Sep 23	04:45:05	4095	11820	T-	pp	-0.0255	2.8167	1.8058	344.5	222.9	102.4
39	01	2973	Oct 03	12:12:54	4226	12043	T-	pp	-0.0829	2.7144	1.6974	345.8	222.7	101.0
40	02	2991	Oct 14	19:45:08	4360	12266	T-	pp	-0.1358	2.6204	1.5973	346.8	221.9	98.1
41	03	3009	Oct 26	03:25:16	4496	12489	T-	-p	-0.1813	2.5400	1.5107	347.5	220.8	94.4
42	04	3027	Nov 06	11:11:30	4634	12712	T-	-p	-0.2208	2.4708	1.4352	348.1	219.5	90.0
43	05	3045	Nov 16	19:05:41	4773	12935	T-	-p	-0.2531	2.4144	1.3729	348.6	218.2	85.5
44	06	3063	Nov 28	03:05:01	4915	13158	T	-p	-0.2804	2.3673	1.3199	349.2	216.9	80.9
45	07	3081	Dec 08	11:11:31	5060	13381	T	-p	-0.3013	2.3317	1.2790	349.9	215.9	76.8
46	08	3099	Dec 19	19:22:17	5206	13604	T	-p	-0.3178	2.3039	1.2462	350.7	215.1	73.2
47	09	3117	Dec 31	03:37:06	5354	13827	T	-p	-0.3302	2.2834	1.2214	351.5	214.5	70.1
48	10	3136	Jan 11	11:54:16	5504	14050	T	-p	-0.3400	2.2673	1.2015	352.4	214.2	67.5
49	11	3154	Jan 21	20:12:47	5656	14273	T	-p	-0.3479	2.2544	1.1855	353.3	213.9	65.2
50	12	3172	Feb 02	04:30:18	5811	14496	T	-a	-0.3560	2.2408	1.1694	354.0	213.7	62.8
51	13	3190	Feb 12	12:45:01	5967	14719	T	-a	-0.3657	2.2238	1.1507	354.6	213.3	59.7
52	14	3208	Feb 23	20:56:14	6126	14942	T	-a	-0.3775	2.2027	1.1284	354.9	212.6	55.7
53	15	3226	Mar 06	05:02:00	6287	15165	T	-h	-0.3929	2.1748	1.1000	354.9	211.6	49.7
54	16	3244	Mar 16	13:00:14	6449	15388	T	-t	-0.4139	2.1362	1.0613	354.4	209.9	39.5
55	17	3262	Mar 27	20:50:47	6614	15611	T	-t	-0.4407	2.0870	1.0124	353.4	207.4	18.1
56	18	3280	Apr 07	04:32:29	6781	15834	P	-t	-0.4741	2.0253	0.9514	351.7	203.8	-
57	19	3298	Apr 18	12:05:38	6950	16057	P	-t	-0.5139	1.9517	0.8788	349.3	198.9	-
58	20	3316	Apr 29	19:27:58	7121	16280	P	-t	-0.5619	1.8632	0.7912	345.8	192.1	-
59	21	3334	May 11	02:41:56	7294	16503	P	-t	-0.6163	1.7628	0.6920	341.1	183.1	-
60	22	3352	May 21	09:46:04	7469	16726	P	-t	-0.6784	1.6484	0.5786	335.1	171.0	-
61	23	3370	Jun 01	16:42:21	7646	16949	P	-t	-0.7461	1.5236	0.4548	327.4	154.9	-

SAROS SERIES

163

ECLIPSE

01	-33	2371	Aug 27	05:10:45	952	4596	Nb	t-	-1.5155	0.0931	-0.9387	89.7	-	-
02	-32	2389	Sep 06	12:15:03	1016	4819	N	t-	-1.4545	0.2079	-0.8294	133.3	-	-
03	-31	2407	Sep 17	19:23:23	1083	5042	N	t-	-1.3973	0.3159	-0.7273	163.4	-	-
04	-30	2425	Sep 28	02:37:33	1151	5265	N	t-	-1.3452	0.4143	-0.6347	186.2	-	-
05	-29	2443	Oct 09	09:58:19	1222	5488	N	t-	-1.2987	0.5027	-0.5525	204.3	-	-
06	-28	2461	Oct 19	17:26:44	1295	5711	N	t-	-1.2586	0.5792	-0.4818	218.6	-	-
07	-27	2479	Oct 31	01:02:53	1370	5934	N	t-	-1.2253	0.6433	-0.4235	229.8	-	-
08	-26	2497	Nov 10	08:44:48	1447	6157	N	t-	-1.1969	0.6981	-0.3742	239.0	-	-
09	-25	2515	Nov 22	16:34:46	1526	6380	N	t-	-1.1754	0.7402	-0.3374	246.0	-	-
10	-24	2533	Dec 03	00:30:10	1607	6603	N	t-	-1.1584	0.7739	-0.3083	251.5	-	-
11	-23	2551	Dec 14	08:31:21	1690	6826	N	t-	-1.1463	0.7981	-0.2882	255.6	-	-
12	-22	2569	Dec 24	16:35:18	1775	7049	N	t-	-1.1366	0.8176	-0.2721	258.9	-	-
13	-21	2588	Jan 05	00:42:53	1862	7272	N	t-	-1.1301	0.8309	-0.2615	261.2	-	-
14	-20	2606	Jan 16	08:50:19	1952	7495	N	t-	-1.1237	0.8436	-0.2508	263.5	-	-
15	-19	2624	Jan 27	16:56:50	2043	7718	N	t-	-1.1169	0.8567	-0.2389	265.7	-	-
16	-18	2642	Feb 07	01:00:14	2137	7941	N	t-	-1.1078	0.8738	-0.2223	268.2	-	-
17	-17	2660	Feb 18	09:00:08	2232	8164	N	t-	-1.0960	0.8952	-0.2007	271.3	-	-
18	-16	2678	Feb 28	16:52:54	2330	8387	N	t-	-1.0788	0.9264	-0.1687	275.4	-	-
19	-15	2696	Mar 11	00:39:17	2430	8610	N	t-	-1.0567	0.9663	-0.1274	280.3	-	-
20	-14	2714	Mar 23	08:17:02	2531	8833	Nx	t-	-1.0277	1.0184	-0.0734	286.3	-	-
21	-13	2732	Apr 02	15:47:26	2635	9056	Nx	t-	-0.9928	1.0814	-0.0082	293.2	-	-
22	-12	2750	Apr 13	23:06:26	2741	9279	P	t-	-0.9488	1.1608	0.0737	301.2	66.4	-
23	-11	2768	Apr 24	06:18:26	2849	9502	P	t-	-0.8992	1.2506	0.1661	309.6	98.5	-
24	-10	2786	May 05	13:19:52	2959	9725	P	t-	-0.8411	1.3559	0.2741	318.5	124.6	-
25	-09	2804	May 15	20:15:12	3071	9948	P	t-	-0.7776	1.4710	0.3919	327.3	146.4	-
26	-08	2822	May 27	03:00:29	3186	10171	P	t-	-0.7058	1.6015	0.5249	336.1	165.9	-
27	-07	2840	Jun 06	09:42:03	3302	10394	P	t-	-0.6306	1.7383	0.6640	344.1	182.4	-

28	-06	2858	Jun 17	16:16:02	3420	10617	P	t-	-0.5494	1.8862	0.8140	351.6	196.7	-
29	-05	2876	Jun 27	22:47:35	3541	10840	P	t-	-0.4657	2.0389	0.9686	358.0	208.6	-
30	-04	2894	Jul 09	05:14:55	3663	11063	T	t-	-0.3782	2.1987	1.1298	363.3	218.2	57.4
31	-03	2912	Jul 20	11:43:06	3788	11286	T	tp	-0.2912	2.3578	1.2900	367.4	225.5	81.2
32	-02	2930	Jul 31	18:10:59	3915	11509	T-	pp	-0.2036	2.5181	1.4511	370.2	230.6	94.9
33	-01	2948	Aug 11	00:41:12	4043	11732	T-	pp	-0.1176	2.6757	1.6091	371.8	233.7	102.7
34	00	2966	Aug 22	07:15:12	4174	11955	T-	pp	-0.0345	2.8282	1.7616	372.3	234.9	105.9
35	01	2984	Sep 01	13:54:23	4307	12178	T+	pp	0.0446	2.8098	1.7430	371.7	234.5	105.6
36	02	3002	Sep 13	20:39:57	4442	12401	T+	pp	0.1191	2.6733	1.6059	370.3	232.6	102.1
37	03	3020	Sep 24	03:32:39	4579	12624	T+	pp	0.1882	2.5471	1.4789	368.1	229.6	95.9
38	04	3038	Oct 05	10:34:33	4718	12847	T+	pp	0.2502	2.4336	1.3645	365.5	225.9	87.5
39	05	3056	Oct 15	17:45:35	4859	13070	T	pp	0.3053	2.3332	1.2631	362.6	221.6	77.1
40	06	3074	Oct 27	01:05:39	5002	13293	T	-p	0.3535	2.2451	1.1740	359.5	217.2	64.5
41	07	3092	Nov 06	08:36:06	5148	13516	T	-p	0.3940	2.1714	1.0994	356.6	212.9	49.9
42	08	3110	Nov 18	16:16:10	5295	13739	T	-t	0.4274	2.1104	1.0377	353.8	208.8	31.2
43	09	3128	Nov 29	00:05:39	5445	13962	P	-t	0.4535	2.0627	0.9896	351.2	205.3	-
44	10	3146	Dec 10	08:02:05	5596	14185	P	-t	0.4746	2.0240	0.9509	348.9	202.3	-
45	11	3164	Dec 20	16:06:44	5750	14408	P	-t	0.4896	1.9962	0.9236	346.9	199.9	-
46	12	3183	Jan 01	00:16:57	5905	14631	P	-t	0.5009	1.9749	0.9032	345.1	197.9	-
47	13	3201	Jan 11	08:31:39	6063	14854	P	-t	0.5091	1.9591	0.8891	343.4	196.4	-
48	14	3219	Jan 22	16:48:43	6223	15077	P	-t	0.5160	1.9454	0.8776	341.8	195.1	-
49	15	3237	Feb 02	01:07:25	6385	15300	P	-t	0.5221	1.9325	0.8678	340.1	193.8	-
50	16	3255	Feb 13	09:25:50	6549	15523	P	-t	0.5292	1.9178	0.8566	338.2	192.5	-
51	17	3273	Feb 23	17:41:23	6715	15746	P	-t	0.5393	1.8970	0.8401	336.0	190.7	-
52	18	3291	Mar 07	01:54:27	6883	15969	P	-t	0.5523	1.8708	0.8186	333.4	188.5	-
53	19	3309	Mar 18	10:02:32	7053	16192	P	-t	0.5700	1.8358	0.7888	330.4	185.5	-
54	20	3327	Mar 29	18:05:22	7225	16415	P	-t	0.5928	1.7911	0.7497	326.7	181.6	-
55	21	3345	Apr 09	02:01:21	7400	16638	P	-t	0.6219	1.7347	0.6992	322.4	176.3	-

56	22	3363	Apr 20	09:51:38	7576	16861	P	-t	0.6565	1.6681	0.6388	317.3	169.8	-
57	23	3381	Apr 30	17:35:11	7754	17084	P	-t	0.6974	1.5899	0.5668	311.2	161.3	-
58	24	3399	May 12	01:11:32	7935	17307	P	-t	0.7450	1.4995	0.4825	304.1	150.4	-
59	25	3417	May 23	08:42:17	8118	17530	P	-t	0.7976	1.3999	0.3890	295.9	136.6	-
60	26	3435	Jun 03	16:07:24	8302	17753	P	-t	0.8554	1.2909	0.2857	286.4	118.5	-
61	27	3453	Jun 13	23:28:23	8489	17976	P	-h	0.9174	1.1745	0.1748	275.5	93.9	-
62	28	3471	Jun 25	06:44:45	8678	18199	P	-h	0.9836	1.0505	0.0558	262.9	53.7	-
63	29	3489	Jul 05	13:59:38	8869	18422	N	-h	1.0516	0.9233	-0.0668	248.7	-	-
64	30	3507	Jul 17	21:12:30	9062	18645	N	-h	1.1215	0.7931	-0.1929	232.7	-	-
65	31	3525	Jul 28	04:25:20	9257	18868	N	-h	1.1920	0.6618	-0.3205	214.5	-	-
66	32	3543	Aug 08	11:39:05	9454	19091	N	-h	1.2623	0.5314	-0.4480	193.9	-	-
67	33	3561	Aug 18	18:55:42	9653	19314	N	-a	1.3307	0.4045	-0.5724	170.7	-	-
68	34	3579	Aug 30	02:16:23	9854	19537	N	-a	1.3963	0.2832	-0.6918	144.0	-	-
69	35	3597	Sep 09	09:40:54	10058	19760	N	-a	1.4594	0.1668	-0.8068	111.3	-	-
70	36	3615	Sep 20	17:12:23	10263	19983	Ne	-a	1.5173	0.0600	-0.9128	67.2	-	-

SAROS SERIES

164

Saros series 164 contains 71 lunar eclipses.

PHASE													
DURATIONS													
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-34	2400 Aug 05 12:01:19	1056	4954	Nb t-	1.5295	0.0755	-0.9722	82.8	-	-	-	-
02	-33	2418 Aug 16 18:46:36	1124	5177	N t-	1.4488	0.2230	-0.8236	140.0	-	-	-	-
03	-32	2436 Aug 27 01:39:06	1194	5400	N t-	1.3726	0.3624	-0.6832	175.7	-	-	-	-
04	-31	2454 Sep 07 08:37:33	1266	5623	N t-	1.2998	0.4955	-0.5495	202.2	-	-	-	-
05	-30	2472 Sep 17 15:45:51	1340	5846	N t-	1.2338	0.6166	-0.4282	222.3	-	-	-	-
06	-29	2490 Sep 28 23:02:21	1416	6069	N t-	1.1733	0.7276	-0.3170	238.2	-	-	-	-
07	-28	2508 Oct 10 06:29:19	1494	6292	N h-	1.1203	0.8248	-0.2198	250.4	-	-	-	-
08	-27	2526 Oct 21 14:05:41	1574	6515	N h-	1.0739	0.9099	-0.1348	260.0	-	-	-	-
09	-26	2544 Oct 31 21:52:27	1657	6738	N h-	1.0350	0.9813	-0.0633	267.2	-	-	-	-
10	-25	2562 Nov 12 05:48:45	1741	6961	Nx a-	1.0030	1.0401	-0.0045	272.5	-	-	-	-
11	-24	2580 Nov 22 13:52:59	1828	7184	P a-	0.9765	1.0883	0.0442	276.5	49.1	-	-	-
12	-23	2598 Dec 03 22:06:11	1916	7407	P a-	0.9567	1.1243	0.0809	279.1	65.9	-	-	-
13	-22	2616 Dec 15 06:25:32	2007	7630	P a-	0.9418	1.1512	0.1090	280.7	76.0	-	-	-
14	-21	2634 Dec 26 14:51:05	2099	7853	P a-	0.9309	1.1703	0.1298	281.5	82.4	-	-	-
15	-20	2653 Jan 05 23:18:55	2194	8076	P a-	0.9213	1.1867	0.1484	282.0	87.7	-	-	-
16	-19	2671 Jan 17 07:50:18	2291	8299	P a-	0.9141	1.1985	0.1630	282.0	91.4	-	-	-
17	-18	2689 Jan 27 16:21:23	2390	8522	P a-	0.9063	1.2111	0.1790	282.0	95.3	-	-	-
18	-17	2707 Feb 09 00:51:51	2491	8745	P a-	0.8975	1.2254	0.1972	282.2	99.5	-	-	-
19	-16	2725 Feb 19 09:18:57	2594	8968	P a-	0.8854	1.2453	0.2216	282.7	104.8	-	-	-
20	-15	2743 Mar 02 17:43:04	2699	9191	P a-	0.8700	1.2710	0.2523	283.7	111.0	-	-	-
21	-14	2761 Mar 13 02:01:39	2806	9414	P a-	0.8496	1.3058	0.2923	285.2	118.5	-	-	-

22	-13	2779	Mar 24	10:14:32	2916	9637	P	a-	0.8238	1.3502	0.3424	287.3	126.9	-
23	-12	2797	Apr 03	18:20:53	3027	9860	P	a-	0.7919	1.4059	0.4038	290.1	136.2	-
24	-11	2815	Apr 15	02:21:28	3140	10083	P	a-	0.7546	1.4715	0.4752	293.3	145.8	-
25	-10	2833	Apr 25	10:13:57	3256	10306	P	a-	0.7096	1.5511	0.5606	297.0	155.8	-
26	-09	2851	May 06	18:01:05	3373	10529	P	a-	0.6594	1.6403	0.6554	300.8	165.5	-
27	-08	2869	May 17	01:41:13	3493	10752	P	a-	0.6026	1.7419	0.7625	304.8	175.0	-
28	-07	2887	May 28	09:17:42	3615	10975	P	a-	0.5420	1.8504	0.8761	308.6	183.5	-
29	-06	2905	Jun 08	16:47:10	3738	11198	T	a-	0.4748	1.9715	1.0018	312.3	191.4	6.5
30	-05	2923	Jun 20	00:15:08	3864	11421	T	a-	0.4056	2.0963	1.1308	315.4	198.0	53.0
31	-04	2941	Jun 30	07:38:52	3992	11644	T	a-	0.3319	2.2297	1.2678	318.1	203.7	72.4
32	-03	2959	Jul 11	15:02:55	4122	11867	T+	p-	0.2581	2.3636	1.4048	320.0	208.0	84.6
33	-02	2977	Jul 21	22:24:47	4254	12090	T+	p-	0.1818	2.5024	1.5460	321.3	211.1	92.9
34	-01	2995	Aug 02	05:50:01	4388	12313	T+	pp	0.1077	2.6375	1.6830	321.9	212.9	97.7
35	00	3013	Aug 13	13:16:15	4525	12536	T+	pp	0.0336	2.7727	1.8193	321.9	213.6	99.8
36	01	3031	Aug 24	20:46:39	4663	12759	T-	pp	-0.0374	2.7655	1.8129	321.2	213.2	99.6
37	02	3049	Sep 04	04:20:42	4803	12982	T-	pp	-0.1057	2.6401	1.6875	320.0	211.8	97.3
38	03	3067	Sep 15	12:01:09	4946	13205	T-	p-	-0.1690	2.5241	1.5711	318.3	209.7	93.2
39	04	3085	Sep 25	19:47:45	5090	13428	T-	p-	-0.2277	2.4169	1.4630	316.4	206.9	87.5
40	05	3103	Oct 08	03:40:51	5237	13651	T	p-	-0.2813	2.3191	1.3639	314.2	203.8	80.4
41	06	3121	Oct 18	11:42:01	5385	13874	T	p-	-0.3285	2.2335	1.2766	312.1	200.5	72.1
42	07	3139	Oct 29	19:50:43	5536	14097	T	p-	-0.3696	2.1589	1.2003	310.0	197.1	62.8
43	08	3157	Nov 09	04:07:21	5689	14320	T	p-	-0.4041	2.0966	1.1360	308.1	194.0	52.8
44	09	3175	Nov 20	12:31:05	5844	14543	T	p-	-0.4328	2.0449	1.0823	306.4	191.1	41.7
45	10	3193	Nov 30	21:02:13	6001	14766	T	-a	-0.4556	2.0041	1.0395	305.0	188.7	29.2
46	11	3211	Dec 12	05:39:37	6160	14989	T	-a	-0.4732	1.9727	1.0064	303.9	186.7	11.8
47	12	3229	Dec 22	14:21:47	6321	15212	P	-a	-0.4868	1.9485	0.9806	303.1	185.1	-
48	13	3248	Jan 02	23:08:51	6484	15435	P	-a	-0.4964	1.9315	0.9624	302.5	183.9	-
49	14	3266	Jan 13	07:58:51	6649	15658	P	-a	-0.5033	1.9194	0.9494	302.1	183.1	-

50	15	3284	Jan 24	16:50:34	6816	15881	P	-a	-0.5091	1.9089	0.9385	301.8	182.4	-
51	16	3302	Feb 05	01:41:40	6986	16104	P	-a	-0.5154	1.8974	0.9269	301.4	181.7	-
52	17	3320	Feb 16	10:31:49	7157	16327	P	-a	-0.5224	1.8843	0.9141	301.0	181.0	-
53	18	3338	Feb 26	19:19:24	7331	16550	P	-a	-0.5315	1.8672	0.8977	300.4	180.0	-
54	19	3356	Mar 09	04:02:02	7506	16773	P	-a	-0.5448	1.8423	0.8739	299.5	178.4	-
55	20	3374	Mar 20	12:39:48	7684	16996	P	-a	-0.5620	1.8102	0.8429	298.3	176.4	-
56	21	3392	Mar 30	21:10:43	7864	17219	P	-a	-0.5852	1.7669	0.8012	296.6	173.3	-
57	22	3410	Apr 12	05:35:20	8045	17442	P	-a	-0.6132	1.7148	0.7505	294.3	169.4	-
58	23	3428	Apr 22	13:50:57	8229	17665	P	-a	-0.6486	1.6491	0.6863	291.3	164.0	-
59	24	3446	May 03	21:59:51	8415	17888	P	-a	-0.6893	1.5738	0.6123	287.5	157.0	-
60	25	3464	May 14	06:00:16	8603	18111	P	-a	-0.7369	1.4857	0.5254	282.7	147.6	-
61	26	3482	May 25	13:53:10	8793	18334	P	-a	-0.7904	1.3872	0.4277	276.8	135.4	-
62	27	3500	Jun 05	21:38:31	8985	18557	P	-a	-0.8499	1.2778	0.3187	269.5	119.0	-
63	28	3518	Jun 17	05:17:49	9180	18780	P	-a	-0.9140	1.1602	0.2012	260.8	96.4	-
64	29	3536	Jun 27	12:51:34	9376	19003	P	-a	-0.9821	1.0353	0.0759	250.3	60.4	-
65	30	3554	Jul 08	20:19:30	9574	19226	N	-a	-1.0545	0.9031	-0.0575	237.7	-	-
66	31	3572	Jul 19	03:44:31	9775	19449	N	-a	-1.1288	0.7675	-0.1946	222.8	-	-
67	32	3590	Jul 30	11:06:41	9977	19672	N	-a	-1.2051	0.6287	-0.3356	205.1	-	-
68	33	3608	Aug 09	18:27:56	10182	19895	N	-a	-1.2812	0.4904	-0.4767	184.2	-	-
69	34	3626	Aug 21	01:48:13	10388	20118	N	-a	-1.3574	0.3522	-0.6182	158.8	-	-
70	35	3644	Aug 31	09:10:41	10597	20341	N	-a	-1.4311	0.2189	-0.7554	127.2	-	-
71	36	3662	Sep 11	16:35:05	10808	20564	Ne	-a	-1.5026	0.0901	-0.8886	82.9	-	-

SAROS SERIES

165

Saros series 165 contains 71 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-37	2411 Jul 06 10:22:42	1097	5089	Nb a-	-1.5404	0.0027	-0.9404	14.0	-	-			
02	-36	2429 Jul 16 17:51:15	1166	5312	N a-	-1.4688	0.1337	-0.8085	96.5	-	-			
03	-35	2447 Jul 28 01:20:15	1237	5535	N a-	-1.3974	0.2645	-0.6775	134.0	-	-			
04	-34	2465 Aug 07 08:51:22	1310	5758	N a-	-1.3275	0.3929	-0.5495	161.3	-	-			
05	-33	2483 Aug 18 16:25:11	1386	5981	N a-	-1.2596	0.5181	-0.4253	183.0	-	-			
06	-32	2501 Aug 30 00:04:13	1463	6204	N a-	-1.1957	0.6361	-0.3089	200.4	-	-			
07	-31	2519 Sep 10 07:48:23	1542	6427	N a-	-1.1363	0.7462	-0.2007	214.8	-	-			
08	-30	2537 Sep 20 15:38:06	1624	6650	N a-	-1.0812	0.8485	-0.1009	226.8	-	-			
09	-29	2555 Oct 01 23:35:11	1708	6873	N a-	-1.0323	0.9398	-0.0126	236.6	-	-			
10	-28	2573 Oct 12 07:39:27	1793	7096	P a-	-0.9892	1.0204	0.0649	244.7	55.0	-			
11	-27	2591 Oct 23 15:51:13	1881	7319	P a-	-0.9525	1.0893	0.1306	251.2	77.4	-			
12	-26	2609 Nov 04 00:09:40	1971	7542	P a-	-0.9216	1.1479	0.1857	256.6	91.6	-			
13	-25	2627 Nov 15 08:35:40	2063	7765	P a-	-0.8972	1.1943	0.2287	260.8	101.1	-			

14	-24	2645	Nov 25	17:08:16	2157	7988	P	a-	-0.8783	1.2306	0.2617	264.1	107.7	-
15	-23	2663	Dec 07	01:45:56	2253	8211	P	a-	-0.8640	1.2584	0.2865	266.7	112.4	-
16	-22	2681	Dec 17	10:29:13	2351	8434	P	a-	-0.8545	1.2772	0.3024	268.6	115.4	-
17	-21	2699	Dec 28	19:15:28	2451	8657	P	a-	-0.8478	1.2909	0.3137	270.1	117.5	-
18	-20	2718	Jan 09	04:04:42	2553	8880	P	a-	-0.8440	1.2988	0.3196	271.2	118.6	-
19	-19	2736	Jan 20	12:52:56	2657	9103	P	a-	-0.8396	1.3076	0.3269	272.3	120.0	-
20	-18	2754	Jan 30	21:42:08	2764	9326	P	a-	-0.8364	1.3141	0.3321	273.3	121.0	-
21	-17	2772	Feb 11	06:27:48	2872	9549	P	a-	-0.8304	1.3255	0.3429	274.6	123.0	-
22	-16	2790	Feb 21	15:10:34	2983	9772	P	a-	-0.8225	1.3401	0.3571	276.2	125.5	-
23	-15	2808	Mar 03	23:46:51	3095	9995	P	a-	-0.8098	1.3635	0.3805	278.4	129.3	-
24	-14	2826	Mar 15	08:18:11	3210	10218	P	a-	-0.7934	1.3935	0.4107	281.1	134.1	-
25	-13	2844	Mar 25	16:41:29	3327	10441	P	a-	-0.7707	1.4348	0.4524	284.4	140.1	-
26	-12	2862	Apr 06	00:56:58	3446	10664	P	a-	-0.7422	1.4869	0.5050	288.4	147.2	-
27	-11	2880	Apr 16	09:03:38	3566	10887	P	a-	-0.7070	1.5513	0.5697	293.0	155.2	-
28	-10	2898	Apr 27	17:02:17	3689	11110	P	a-	-0.6660	1.6265	0.6452	298.1	163.6	-
29	-09	2916	May 09	00:51:40	3814	11333	P	a-	-0.6179	1.7148	0.7335	303.5	172.3	-
30	-08	2934	May 20	08:33:11	3942	11556	P	a-	-0.5637	1.8142	0.8327	309.2	181.1	-
31	-07	2952	May 30	16:06:21	4071	11779	P	a-	-0.5036	1.9248	0.9427	314.9	189.5	-
32	-06	2970	Jun 10	23:33:32	4202	12002	T	a-	-0.4392	2.0435	1.0603	320.3	197.3	37.2
33	-05	2988	Jun 21	06:52:51	4335	12225	T	p-	-0.3691	2.1730	1.1882	325.6	204.4	63.4
34	-04	3006	Jul 03	14:08:38	4471	12448	T	p-	-0.2967	2.3068	1.3200	330.3	210.5	79.2
35	-03	3024	Jul 13	21:19:17	4608	12671	T-	pp	-0.2211	2.4470	1.4575	334.4	215.4	90.3
36	-02	3042	Jul 25	04:29:03	4748	12894	T-	pp	-0.1452	2.5878	1.5952	337.8	219.0	97.4
37	-01	3060	Aug 04	11:35:19	4889	13117	T-	pp	-0.0674	2.7325	1.7361	340.5	221.5	101.5
38	00	3078	Aug 15	18:43:42	5033	13340	T+	pp	0.0078	2.8439	1.8433	342.4	222.6	102.8
39	01	3096	Aug 26	01:51:32	5179	13563	T+	pp	0.0825	2.7092	1.7038	343.6	222.4	101.3
40	02	3114	Sep 07	09:03:01	5326	13786	T+	pp	0.1534	2.5817	1.5712	344.1	221.2	97.2
41	03	3132	Sep 17	16:16:36	5476	14009	T+	-p	0.2217	2.4592	1.4431	344.0	218.8	90.5

42	04	3150	Sep 28	23:36:26	5628	14232	T	-p	0.2840	2.3478	1.3260	343.4	215.7	81.3
43	05	3168	Oct 09	07:00:53	5782	14455	T	-a	0.3413	2.2457	1.2177	342.6	212.0	69.2
44	06	3186	Oct 20	14:31:19	5938	14678	T	-a	0.3929	2.1543	1.1201	341.5	207.9	53.2
45	07	3204	Oct 30	22:08:37	6097	14901	T	-a	0.4379	2.0748	1.0345	340.5	203.7	29.3
46	08	3222	Nov 11	05:52:47	6257	15124	P	-a	0.4766	2.0069	0.9605	339.5	199.5	-
47	09	3240	Nov 21	13:43:51	6419	15347	P	-a	0.5087	1.9510	0.8987	338.7	195.7	-
48	10	3258	Dec 02	21:40:21	6584	15570	P	-a	0.5356	1.9045	0.8465	338.1	192.2	-
49	11	3276	Dec 13	05:43:30	6750	15793	P	-a	0.5563	1.8691	0.8060	337.9	189.3	-
50	12	3294	Dec 24	13:51:04	6919	16016	P	-a	0.5730	1.8408	0.7730	337.8	186.9	-
51	13	3313	Jan 04	22:02:19	7089	16239	P	-a	0.5860	1.8188	0.7470	337.9	185.0	-
52	14	3331	Jan 16	06:15:54	7262	16462	P	-a	0.5968	1.8008	0.7256	338.1	183.5	-
53	15	3349	Jan 26	14:30:35	7437	16685	P	-h	0.6061	1.7851	0.7071	338.3	182.1	-
54	16	3367	Feb 06	22:44:04	7613	16908	P	-h	0.6159	1.7681	0.6881	338.4	180.6	-
55	17	3385	Feb 17	06:54:34	7792	17131	P	-h	0.6278	1.7470	0.6655	338.1	178.7	-
56	18	3403	Mar 01	15:01:19	7973	17354	P	-t	0.6423	1.7208	0.6387	337.4	176.2	-
57	19	3421	Mar 11	23:02:35	8156	17577	P	-t	0.6609	1.6869	0.6045	336.2	172.8	-
58	20	3439	Mar 23	06:56:03	8342	17800	P	-t	0.6851	1.6422	0.5602	334.1	167.9	-
59	21	3457	Apr 02	14:41:55	8529	18023	P	-t	0.7149	1.5872	0.5059	331.2	161.2	-
60	22	3475	Apr 13	22:18:32	8718	18246	P	-t	0.7516	1.5192	0.4391	327.1	152.1	-
61	23	3493	Apr 24	05:46:58	8909	18469	P	-t	0.7946	1.4397	0.3609	321.8	139.8	-
62	24	3511	May 06	13:04:06	9103	18692	P	-t	0.8459	1.3447	0.2675	314.8	122.2	-
63	25	3529	May 16	20:13:39	9298	18915	P	-t	0.9028	1.2396	0.1638	306.1	97.2	-
64	26	3547	May 28	03:13:02	9496	19138	P	-t	0.9670	1.1211	0.0467	295.2	52.9	-
65	27	3565	Jun 07	10:05:41	9695	19361	N	-t	1.0361	0.9936	-0.0794	281.9	-	-
66	28	3583	Jun 18	16:49:31	9897	19584	N	-t	1.1118	0.8541	-0.2178	265.3	-	-
67	29	3601	Jun 28	23:28:45	10101	19807	N	-t	1.1905	0.7092	-0.3618	245.5	-	-
68	30	3619	Jul 10	06:02:23	10307	20030	N	-t	1.2728	0.5579	-0.5125	221.1	-	-
69	31	3637	Jul 20	12:32:51	10515	20253	N	-t	1.3571	0.4032	-0.6669	190.8	-	-

70 32 3655 Jul 31 19:01:08 10725 20476 N -t 1.4423 0.2468 -0.8233 151.5 - -
71 33 3673 Aug 11 01:29:36 10937 20699 Ne -t 1.5265 0.0925 -0.9781 94.1 - -

SAROS SERIES

166

Saros series 166 contains 70 lunar eclipses.

													PHASE
													DURATIONS
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-34	2494 Jul 18 19:45:14	1432	6116	Nb	t-	1.5603	0.0070	-1.0171	24.6	-	-	
02	-33	2512 Jul 30 02:35:53	1511	6339	N	t-	1.4873	0.1429	-0.8850	110.6	-	-	
03	-32	2530 Aug 10 09:26:46	1592	6562	N	t-	1.4146	0.2785	-0.7537	153.2	-	-	
04	-31	2548 Aug 20 16:20:01	1674	6785	N	t-	1.3441	0.4103	-0.6267	184.4	-	-	
05	-30	2566 Aug 31 23:15:21	1759	7008	N	t-	1.2755	0.5387	-0.5034	209.7	-	-	
06	-29	2584 Sep 11 06:16:14	1846	7231	N	t-	1.2116	0.6587	-0.3888	230.1	-	-	
07	-28	2602 Sep 23 13:21:50	1935	7454	N	t-	1.1517	0.7714	-0.2817	247.3	-	-	

08	-27	2620	Oct 03	20:33:57	2026	7677	N	t-	1.0976	0.8736	-0.1853	261.5	-	-
09	-26	2638	Oct 15	03:52:17	2119	7900	N	t-	1.0489	0.9659	-0.0987	273.4	-	-
10	-25	2656	Oct 25	11:18:45	2214	8123	Nx	t-	1.0074	1.0448	-0.0254	283.0	-	-
11	-24	2674	Nov 05	18:52:17	2312	8346	P	t-	0.9718	1.1130	0.0373	291.1	46.8	-
12	-23	2692	Nov 16	02:32:31	2411	8569	P	t-	0.9420	1.1702	0.0894	297.6	72.0	-
13	-22	2710	Nov 28	10:19:44	2513	8792	P	t-	0.9184	1.2159	0.1304	302.8	86.6	-
14	-21	2728	Dec 08	18:13:34	2616	9015	P	t-	0.9008	1.2503	0.1606	306.8	95.9	-
15	-20	2746	Dec 20	02:11:51	2722	9238	P	t-	0.8870	1.2774	0.1842	309.9	102.5	-
16	-19	2764	Dec 30	10:14:06	2829	9461	P	t-	0.8767	1.2977	0.2015	312.4	107.1	-
17	-18	2783	Jan 10	18:18:02	2939	9684	P	t-	0.8680	1.3147	0.2164	314.4	110.9	-
18	-17	2801	Jan 21	02:23:42	3051	9907	P	t-	0.8610	1.3284	0.2287	316.1	114.0	-
19	-16	2819	Feb 01	10:26:27	3165	10130	P	t-	0.8520	1.3452	0.2448	317.9	117.8	-
20	-15	2837	Feb 11	18:28:15	3280	10353	P	t-	0.8424	1.3628	0.2625	319.7	121.8	-
21	-14	2855	Feb 23	02:24:08	3398	10576	P	t-	0.8283	1.3882	0.2887	321.9	127.3	-
22	-13	2873	Mar 05	10:15:36	3518	10799	P	t-	0.8106	1.4200	0.3219	324.5	133.8	-
23	-12	2891	Mar 16	17:57:55	3641	11022	P	t-	0.7856	1.4649	0.3688	328.0	142.3	-
24	-11	2909	Mar 28	01:34:29	3765	11245	P	t-	0.7561	1.5179	0.4242	331.8	151.4	-
25	-10	2927	Apr 08	09:00:57	3891	11468	P	t-	0.7186	1.5853	0.4944	336.3	161.7	-
26	-09	2945	Apr 18	16:19:09	4019	11691	P	t-	0.6742	1.6652	0.5773	341.1	172.5	-
27	-08	2963	Apr 29	23:27:36	4150	11914	P	t-	0.6218	1.7598	0.6750	346.4	183.5	-
28	-07	2981	May 10	06:28:37	4282	12137	P	t-	0.5630	1.8660	0.7845	351.6	194.1	-
29	-06	2999	May 21	13:21:13	4417	12360	P	t-	0.4971	1.9853	0.9069	356.7	204.2	-
30	-05	3017	Jun 01	20:06:36	4554	12583	T	t-	0.4253	2.1156	1.0403	361.4	213.2	32.9
31	-04	3035	Jun 13	02:46:10	4692	12806	T	t-	0.3480	2.2559	1.1834	365.5	220.9	67.0
32	-03	3053	Jun 23	09:21:35	4833	13029	T+	pp	0.2669	2.4035	1.3336	368.7	227.1	85.6
33	-02	3071	Jul 04	15:52:57	4976	13252	T+	pp	0.1819	2.5583	1.4906	370.9	231.6	97.4
34	-01	3089	Jul 14	22:23:10	5121	13475	T+	pp	0.0956	2.7157	1.6500	372.1	234.3	104.0
35	00	3107	Jul 27	04:52:55	5268	13698	T+	pp	0.0082	2.8752	1.8111	372.1	235.1	106.4

36	01	3125	Aug 06	11:25:09	5417	13921	T-	pp	-0.0776	2.7473	1.6843	370.9	234.1	104.7
37	02	3143	Aug 17	17:58:18	5568	14144	T-	pp	-0.1633	2.5897	1.5275	368.7	231.2	98.9
38	03	3161	Aug 28	00:37:03	5721	14367	T-	pp	-0.2448	2.4399	1.3782	365.5	226.8	89.0
39	04	3179	Sep 08	07:20:17	5877	14590	T	pp	-0.3231	2.2961	1.2345	361.4	220.9	73.8
40	05	3197	Sep 18	14:11:39	6034	14813	T	-t	-0.3952	2.1639	1.1022	356.7	213.9	50.8
41	06	3215	Sep 29	21:09:13	6193	15036	P	-t	-0.4627	2.0402	0.9781	351.5	205.9	-
42	07	3233	Oct 10	04:17:12	6355	15259	P	-t	-0.5223	1.9312	0.8686	346.2	197.5	-
43	08	3251	Oct 21	11:33:30	6518	15482	P	-t	-0.5756	1.8338	0.7705	340.8	188.9	-
44	09	3269	Oct 31	18:59:43	6684	15705	P	-t	-0.6211	1.7504	0.6866	335.7	180.4	-
45	10	3287	Nov 12	02:35:10	6852	15928	P	-t	-0.6598	1.6797	0.6153	331.0	172.4	-
46	11	3305	Nov 23	10:20:42	7022	16151	P	-t	-0.6906	1.6233	0.5586	326.8	165.4	-
47	12	3323	Dec 04	18:15:16	7193	16374	P	-t	-0.7150	1.5786	0.5138	323.2	159.4	-
48	13	3341	Dec 15	02:16:52	7367	16597	P	-t	-0.7343	1.5430	0.4787	320.0	154.3	-
49	14	3359	Dec 26	10:26:35	7543	16820	P	-t	-0.7476	1.5182	0.4547	317.5	150.5	-
50	15	3378	Jan 05	18:41:42	7722	17043	P	-t	-0.7567	1.5009	0.4387	315.4	147.8	-
51	16	3396	Jan 17	03:01:26	7902	17266	P	-t	-0.7630	1.4883	0.4280	313.5	145.9	-
52	17	3414	Jan 28	11:22:34	8084	17489	P	-h	-0.7686	1.4767	0.4190	311.7	144.2	-
53	18	3432	Feb 08	19:45:35	8268	17712	P	-h	-0.7735	1.4662	0.4117	309.8	142.7	-
54	19	3450	Feb 19	04:07:27	8455	17935	P	-h	-0.7797	1.4529	0.4022	307.7	140.8	-
55	20	3468	Mar 01	12:26:56	8643	18158	P	-h	-0.7883	1.4349	0.3886	305.3	138.3	-
56	21	3486	Mar 12	20:42:44	8834	18381	P	-h	-0.8005	1.4100	0.3685	302.2	134.8	-
57	22	3504	Mar 24	04:54:09	9026	18604	P	-h	-0.8170	1.3771	0.3410	298.6	129.8	-
58	23	3522	Apr 04	12:59:23	9221	18827	P	-h	-0.8391	1.3336	0.3033	294.0	122.8	-
59	24	3540	Apr 14	20:58:16	9418	19050	P	-h	-0.8670	1.2794	0.2549	288.4	113.0	-
60	25	3558	Apr 26	04:50:46	9616	19273	P	-h	-0.9009	1.2141	0.1958	281.7	99.6	-
61	26	3576	May 06	12:37:21	9817	19496	P	-h	-0.9403	1.1388	0.1265	273.9	80.6	-
62	27	3594	May 17	20:16:12	10020	19719	P	-h	-0.9868	1.0504	0.0442	264.4	48.0	-
63	28	3612	May 28	03:50:28	10225	19942	N	-h	-1.0379	0.9538	-0.0467	253.4	-	-

64	29	3630	Jun 08	11:18:28	10432	20165	N	-h	-1.0949	0.8463	-0.1485	240.3	-	-
65	30	3648	Jun 18	18:43:27	10641	20388	N	-h	-1.1549	0.7336	-0.2561	225.3	-	-
66	31	3666	Jun 30	02:02:56	10853	20611	N	-h	-1.2200	0.6117	-0.3731	207.4	-	-
67	32	3684	Jul 10	09:22:13	11066	20834	N	-h	-1.2860	0.4885	-0.4921	186.8	-	-
68	33	3702	Jul 22	16:38:57	11281	21057	N	-a	-1.3547	0.3603	-0.6164	161.8	-	-
69	34	3720	Aug 01	23:56:41	11499	21280	N	-a	-1.4231	0.2333	-0.7402	131.2	-	-
70	35	3738	Aug 13	07:14:29	11718	21503	N	-a	-1.4917	0.1060	-0.8648	89.2	-	-

SAROS SERIES

167

Saros series 167 contains 71 lunar eclipses.

PHASE													
DURATIONS													
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-34	2541	Jul 09	09:38:29	1641	6697	Nb t-	-1.5025	0.1243	-0.9219	105.7	-	-
02	-33	2559	Jul 20	16:18:32	1725	6920	N t-	-1.4179	0.2780	-0.7654	155.4	-	-

03	-32	2577	Jul 30	23:01:14	1812	7143	N	t-	-1.3341	0.4307	-0.6104	190.0	-	-
04	-31	2595	Aug 11	05:47:49	1900	7366	N	t-	-1.2521	0.5803	-0.4589	216.7	-	-
05	-30	2613	Aug 22	12:40:07	1990	7589	N	t-	-1.1735	0.7237	-0.3140	237.8	-	-
06	-29	2631	Sep 02	19:39:18	2082	7812	N	t-	-1.0994	0.8591	-0.1775	254.8	-	-
07	-28	2649	Sep 13	02:45:09	2177	8035	N	t-	-1.0296	0.9867	-0.0491	268.6	-	-
08	-27	2667	Sep 24	10:00:39	2273	8258	P	h-	-0.9668	1.1018	0.0664	279.4	60.5	-
09	-26	2685	Oct 04	17:24:11	2372	8481	P	h-	-0.9096	1.2066	0.1716	288.2	95.5	-
10	-25	2703	Oct 17	00:58:02	2472	8704	P	h-	-0.8598	1.2979	0.2630	295.0	116.3	-
11	-24	2721	Oct 27	08:40:23	2575	8927	P	a-	-0.8162	1.3779	0.3431	300.2	130.9	-
12	-23	2739	Nov 07	16:33:47	2680	9150	P	a-	-0.7807	1.4430	0.4083	304.0	141.0	-
13	-22	2757	Nov 18	00:35:24	2786	9373	P	a-	-0.7511	1.4970	0.4627	306.7	148.4	-
14	-21	2775	Nov 29	08:45:58	2895	9596	P	a-	-0.7280	1.5391	0.5053	308.5	153.6	-
15	-20	2793	Dec 09	17:03:55	3006	9819	P	a-	-0.7101	1.5715	0.5386	309.5	157.2	-
16	-19	2811	Dec 21	01:29:09	3119	10042	P	a-	-0.6972	1.5945	0.5629	309.9	159.7	-
17	-18	2829	Dec 31	09:58:30	3234	10265	P	a-	-0.6872	1.6120	0.5822	309.9	161.4	-
18	-17	2848	Jan 11	18:31:29	3352	10488	P	a-	-0.6794	1.6252	0.5977	309.6	162.7	-
19	-16	2866	Jan 22	03:06:00	3471	10711	P	a-	-0.6721	1.6372	0.6125	309.2	163.9	-
20	-15	2884	Feb 02	11:41:45	3592	10934	P	a-	-0.6649	1.6486	0.6274	308.8	165.0	-
21	-14	2902	Feb 13	20:14:30	3716	11157	P	a-	-0.6548	1.6652	0.6480	308.5	166.7	-
22	-13	2920	Feb 25	04:45:31	3841	11380	P	a-	-0.6427	1.6852	0.6723	308.4	168.7	-
23	-12	2938	Mar 07	13:11:04	3969	11603	P	a-	-0.6255	1.7143	0.7062	308.7	171.5	-
24	-11	2956	Mar 17	21:33:02	4098	11826	P	a-	-0.6048	1.7496	0.7467	309.3	174.7	-
25	-10	2974	Mar 29	05:46:43	4230	12049	P	a-	-0.5766	1.7987	0.8012	310.4	178.8	-
26	-09	2992	Apr 08	13:56:10	4364	12272	P	a-	-0.5442	1.8554	0.8635	311.7	183.2	-
27	-08	3010	Apr 20	21:57:04	4499	12495	P	a-	-0.5043	1.9258	0.9394	313.3	188.1	-
28	-07	3028	May 01	05:52:42	4637	12718	T	a-	-0.4592	2.0057	1.0248	315.1	193.0	23.8
29	-06	3046	May 12	13:40:15	4777	12941	T	a-	-0.4069	2.0991	1.1234	317.0	197.9	51.6
30	-05	3064	May 22	21:23:32	4919	13164	T	a-	-0.3502	2.2005	1.2298	318.7	202.4	67.9

31	-04	3082	Jun 03	05:00:46	5063	13387	T	p-	-0.2879	2.3126	1.3466	320.3	206.4	80.0
32	-03	3100	Jun 14	12:33:47	5210	13610	T-	p-	-0.2212	2.4328	1.4710	321.4	209.7	89.0
33	-02	3118	Jun 25	20:03:19	5358	13833	T-	p-	-0.1513	2.5592	1.6010	322.2	212.1	95.1
34	-01	3136	Jul 06	03:30:58	5508	14056	T-	pp	-0.0793	2.6897	1.7347	322.3	213.4	98.8
35	00	3154	Jul 17	10:57:12	5661	14279	T-	pp	-0.0056	2.8237	1.8713	321.8	213.7	100.1
36	01	3172	Jul 27	18:23:15	5815	14502	T+	pp	0.0687	2.7069	1.7563	320.7	212.9	99.0
37	02	3190	Aug 08	01:50:37	5972	14725	T+	pp	0.1423	2.5713	1.6221	319.0	211.0	95.5
38	03	3208	Aug 18	09:20:27	6130	14948	T+	-p	0.2138	2.4396	1.4911	316.7	208.1	89.4
39	04	3226	Aug 29	16:52:50	6291	15171	T	-p	0.2835	2.3117	1.3633	313.9	204.2	80.5
40	05	3244	Sep 09	00:30:12	6454	15394	T	-p	0.3493	2.1911	1.2423	310.7	199.5	68.5
41	06	3262	Sep 20	08:12:47	6618	15617	T	-a	0.4110	2.0785	1.1288	307.2	194.1	51.7
42	07	3280	Sep 30	16:02:18	6785	15840	T	-a	0.4669	1.9766	1.0255	303.6	188.4	23.7
43	08	3298	Oct 11	23:57:33	6954	16063	P	-a	0.5182	1.8834	0.9304	300.0	182.4	-
44	09	3316	Oct 23	08:01:12	7125	16286	P	-a	0.5627	1.8028	0.8478	296.6	176.5	-
45	10	3334	Nov 03	16:11:39	7299	16509	P	-a	0.6019	1.7320	0.7747	293.3	170.7	-
46	11	3352	Nov 14	00:30:18	7474	16732	P	-a	0.6345	1.6734	0.7137	290.5	165.5	-
47	12	3370	Nov 25	08:55:31	7651	16955	P	-a	0.6617	1.6246	0.6625	288.1	160.7	-
48	13	3388	Dec 05	17:28:18	7830	17178	P	-a	0.6831	1.5866	0.6222	286.2	156.7	-
49	14	3406	Dec 18	02:06:57	8012	17401	P	-a	0.6996	1.5574	0.5908	284.7	153.5	-
50	15	3424	Dec 28	10:50:20	8195	17624	P	-a	0.7125	1.5345	0.5661	283.6	150.8	-
51	16	3443	Jan 08	19:38:17	8381	17847	P	-a	0.7217	1.5185	0.5485	282.9	148.9	-
52	17	3461	Jan 19	04:28:19	8568	18070	P	-a	0.7295	1.5048	0.5336	282.3	147.3	-
53	18	3479	Jan 30	13:19:52	8758	18293	P	-a	0.7358	1.4937	0.5217	281.8	146.0	-
54	19	3497	Feb 09	22:09:48	8950	18516	P	-a	0.7436	1.4796	0.5073	281.2	144.4	-
55	20	3515	Feb 22	06:59:01	9144	18739	P	-a	0.7518	1.4646	0.4922	280.5	142.7	-
56	21	3533	Mar 04	15:44:20	9340	18962	P	-a	0.7636	1.4427	0.4707	279.4	140.1	-
57	22	3551	Mar 16	00:25:17	9538	19185	P	-a	0.7787	1.4147	0.4434	277.8	136.7	-
58	23	3569	Mar 26	08:59:52	9738	19408	P	-a	0.7989	1.3770	0.4067	275.6	131.8	-

59	24	3587	Apr 06	17:28:28	9940	19631	P	-a	0.8240	1.3305	0.3611	272.7	125.3	-
60	25	3605	Apr 17	01:49:35	10144	19854	P	-a	0.8552	1.2726	0.3044	268.8	116.2	-
61	26	3623	Apr 28	10:02:40	10350	20077	P	-a	0.8930	1.2028	0.2357	263.8	103.4	-
62	27	3641	May 08	18:08:05	10559	20300	P	-a	0.9369	1.1218	0.1557	257.4	85.1	-
63	28	3659	May 20	02:05:51	10769	20523	P	-a	0.9864	1.0305	0.0650	249.7	55.8	-
64	29	3677	May 30	09:55:30	10982	20746	N	-a	1.0424	0.9275	-0.0375	239.9	-	-
65	30	3695	Jun 10	17:38:04	11196	20969	N	-a	1.1038	0.8150	-0.1501	228.1	-	-
66	31	3713	Jun 22	01:13:47	11413	21192	N	-a	1.1700	0.6935	-0.2719	213.6	-	-
67	32	3731	Jul 03	08:44:51	11631	21415	N	-a	1.2395	0.5667	-0.3997	196.0	-	-
68	33	3749	Jul 13	16:09:21	11852	21638	N	-a	1.3134	0.4317	-0.5360	173.9	-	-
69	34	3767	Jul 24	23:31:51	12075	21861	N	-a	1.3878	0.2961	-0.6737	146.3	-	-
70	35	3785	Aug 04	06:50:27	12300	22084	N	-a	1.4646	0.1566	-0.8157	108.1	-	-
71	36	3803	Aug 16	14:09:24	12527	22307	Ne	-a	1.5401	0.0196	-0.9559	38.9	-	-

SAROS SERIES

168

Saros series 168 contains 71 lunar eclipses.

PHASE

DURATIONS

SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-37	2552 Jun 08 07:57:03	1692	6832	Nb a-	1.5204	0.0407	-0.9049	53.8	-	-	-	-
02	-36	2570 Jun 19 15:30:31	1777	7055	N a-	1.4525	0.1642	-0.7793	106.7	-	-	-	-
03	-35	2588 Jun 29 23:02:17	1865	7278	N a-	1.3830	0.2909	-0.6511	140.2	-	-	-	-
04	-34	2606 Jul 12 06:31:08	1954	7501	N a-	1.3108	0.4229	-0.5181	166.9	-	-	-	-
05	-33	2624 Jul 22 14:00:56	2046	7724	N a-	1.2392	0.5542	-0.3865	188.5	-	-	-	-
06	-32	2642 Aug 02 21:30:59	2139	7947	N a-	1.1673	0.6864	-0.2548	207.0	-	-	-	-
07	-31	2660 Aug 13 05:03:27	2235	8170	N a-	1.0975	0.8149	-0.1272	222.7	-	-	-	-
08	-30	2678 Aug 24 12:38:23	2333	8393	N a-	1.0297	0.9402	-0.0036	236.2	-	-	-	-
09	-29	2696 Sep 03 20:18:25	2432	8616	P a-	0.9661	1.0579	0.1121	247.6	71.8	-	-	-
10	-28	2714 Sep 16 04:03:38	2534	8839	P a-	0.9068	1.1680	0.2195	257.3	99.1	-	-	-
11	-27	2732 Sep 26 11:53:56	2638	9062	P a-	0.8518	1.2704	0.3189	265.6	117.8	-	-	-
12	-26	2750 Oct 07 19:51:22	2744	9285	P a-	0.8030	1.3618	0.4069	272.5	131.4	-	-	-
13	-25	2768 Oct 18 03:55:36	2852	9508	P a-	0.7601	1.4423	0.4838	278.3	141.8	-	-	-
14	-24	2786 Oct 29 12:07:55	2962	9731	P a-	0.7239	1.5106	0.5483	283.0	149.5	-	-	-
15	-23	2804 Nov 08 20:26:02	3074	9954	P a-	0.6928	1.5696	0.6034	287.0	155.7	-	-	-
16	-22	2822 Nov 20 04:52:39	3189	10177	P a-	0.6690	1.6152	0.6452	290.1	160.1	-	-	-
17	-21	2840 Nov 30 13:24:44	3305	10400	P a-	0.6501	1.6517	0.6781	292.7	163.4	-	-	-
18	-20	2858 Dec 11 22:03:11	3424	10623	P a-	0.6370	1.6776	0.7006	294.7	165.7	-	-	-
19	-19	2876 Dec 22 06:45:05	3544	10846	P a-	0.6270	1.6974	0.7173	296.4	167.4	-	-	-
20	-18	2895 Jan 02 15:31:21	3667	11069	P a-	0.6211	1.7096	0.7268	297.7	168.5	-	-	-
21	-17	2913 Jan 14 00:18:24	3791	11292	P a-	0.6164	1.7194	0.7343	298.8	169.4	-	-	-
22	-16	2931 Jan 25 09:05:59	3918	11515	P a-	0.6127	1.7271	0.7402	299.9	170.3	-	-	-
23	-15	2949 Feb 04 17:51:55	4047	11738	P a-	0.6082	1.7360	0.7477	301.0	171.2	-	-	-
24	-14	2967 Feb 16 02:35:56	4178	11961	P a-	0.6030	1.7461	0.7569	302.2	172.3	-	-	-

25	-13	2985	Feb 26	11:14:26	4311	12184	P	a-	0.5935	1.7637	0.7739	303.8	174.1	-
26	-12	3003	Mar 10	19:48:07	4446	12407	P	a-	0.5806	1.7876	0.7975	305.6	176.5	-
27	-11	3021	Mar 21	04:14:20	4583	12630	P	a-	0.5622	1.8214	0.8313	307.9	179.6	-
28	-10	3039	Apr 01	12:34:28	4722	12853	P	a-	0.5393	1.8633	0.8733	310.5	183.2	-
29	-09	3057	Apr 11	20:44:19	4863	13076	P	a-	0.5085	1.9197	0.9299	313.6	187.6	-
30	-08	3075	Apr 23	04:47:33	5006	13299	P	a-	0.4728	1.9853	0.9956	317.0	192.4	-
31	-07	3093	May 03	12:40:22	5152	13522	T	p-	0.4286	2.0663	1.0766	320.8	197.6	41.6
32	-06	3111	May 15	20:26:24	5299	13745	T	p-	0.3796	2.1563	1.1664	324.6	202.8	59.8
33	-05	3129	May 26	04:01:46	5449	13968	T	p-	0.3223	2.2616	1.2712	328.5	207.9	73.9
34	-04	3147	Jun 06	11:31:35	5600	14191	T+	p-	0.2612	2.3743	1.3830	332.2	212.5	84.7
35	-03	3165	Jun 16	18:52:53	5754	14414	T+	pp	0.1934	2.4993	1.5066	335.6	216.6	93.0
36	-02	3183	Jun 28	02:08:54	5910	14637	T+	pp	0.1222	2.6310	1.6366	338.4	219.7	98.8
37	-01	3201	Jul 08	09:19:03	6067	14860	T+	pp	0.0467	2.7707	1.7739	340.7	221.7	102.1
38	00	3219	Jul 19	16:26:17	6227	15083	T-	pp	-0.0304	2.8020	1.8024	342.3	222.5	102.6
39	01	3237	Jul 29	23:30:36	6389	15306	T-	pp	-0.1090	2.6594	1.6564	343.0	222.0	100.2
40	02	3255	Aug 10	06:32:59	6553	15529	T-	p-	-0.1883	2.5159	1.5090	342.9	220.0	94.4
41	03	3273	Aug 20	13:35:55	6719	15752	T-	p-	-0.2663	2.3749	1.3637	342.0	216.6	84.7
42	04	3291	Aug 31	20:40:09	6887	15975	T	-a	-0.3425	2.2375	1.2214	340.3	211.7	69.6
43	05	3309	Sep 12	03:47:05	7058	16198	T	-a	-0.4155	2.1063	1.0850	337.9	205.6	45.2
44	06	3327	Sep 23	10:57:34	7230	16421	P	-a	-0.4846	1.9822	0.9553	334.9	198.2	-
45	07	3345	Oct 03	18:13:47	7404	16644	P	-a	-0.5482	1.8685	0.8357	331.6	190.0	-
46	08	3363	Oct 15	01:35:36	7581	16867	P	-h	-0.6064	1.7648	0.7260	328.0	181.0	-
47	09	3381	Oct 25	09:03:00	7759	17090	P	-h	-0.6592	1.6710	0.6262	324.4	171.4	-
48	10	3399	Nov 05	16:37:34	7940	17313	P	-h	-0.7052	1.5896	0.5387	321.0	161.7	-
49	11	3417	Nov 17	00:19:20	8123	17536	P	-h	-0.7442	1.5210	0.4642	317.9	152.3	-
50	12	3435	Nov 28	08:08:01	8307	17759	P	-h	-0.7771	1.4635	0.4011	315.2	143.3	-
51	13	3453	Dec 08	16:02:16	8494	17982	P	-h	-0.8046	1.4158	0.3480	313.0	134.9	-
52	14	3471	Dec 20	00:02:48	8683	18205	P	-h	-0.8260	1.3789	0.3062	311.3	127.6	-

53	15	3489	Dec 30	08:08:11	8874	18428	P	-h	-0.8428	1.3504	0.2734	310.1	121.5	-
54	16	3508	Jan 11	16:16:11	9067	18651	P	-h	-0.8565	1.3269	0.2463	309.2	116.0	-
55	17	3526	Jan 22	00:26:42	9262	18874	P	-h	-0.8677	1.3081	0.2244	308.6	111.3	-
56	18	3544	Feb 02	08:37:08	9459	19097	P	-t	-0.8782	1.2898	0.2038	307.8	106.6	-
57	19	3562	Feb 12	16:47:18	9659	19320	P	-t	-0.8884	1.2719	0.1843	307.0	101.9	-
58	20	3580	Feb 24	00:52:58	9860	19543	P	-t	-0.9017	1.2481	0.1595	305.6	95.3	-
59	21	3598	Mar 06	08:56:09	10063	19766	P	-t	-0.9165	1.2211	0.1322	303.7	87.3	-
60	22	3616	Mar 16	16:52:14	10269	19989	P	-t	-0.9364	1.1844	0.0959	300.8	74.8	-
61	23	3634	Mar 28	00:42:12	10476	20212	P	-t	-0.9610	1.1389	0.0512	296.8	55.1	-
62	24	3652	Apr 07	08:22:49	10686	20435	Nx	-t	-0.9927	1.0800	-0.0065	291.2	-	-
63	25	3670	Apr 18	15:56:19	10897	20658	Nx	-t	-1.0297	1.0114	-0.0735	284.1	-	-
64	26	3688	Apr 28	23:19:55	11111	20881	N	-t	-1.0741	0.9289	-0.1542	274.8	-	-
65	27	3706	May 11	06:34:23	11327	21104	N	-t	-1.1254	0.8339	-0.2472	263.1	-	-
66	28	3724	May 21	13:39:40	11545	21327	N	-t	-1.1835	0.7263	-0.3530	248.3	-	-
67	29	3742	Jun 01	20:36:40	11765	21550	N	-t	-1.2479	0.6071	-0.4702	229.8	-	-
68	30	3760	Jun 12	03:25:41	11987	21773	N	-t	-1.3179	0.4778	-0.5977	206.4	-	-
69	31	3778	Jun 23	10:07:38	12211	21996	N	-t	-1.3929	0.3394	-0.7345	176.3	-	-
70	32	3796	Jul 03	16:44:18	12437	22219	N	-t	-1.4714	0.1945	-0.8780	135.2	-	-
71	33	3814	Jul 15	23:17:08	12665	22442	Ne	-t	-1.5526	0.0450	-1.0265	65.9	-	-

SAROS SERIES

169

Saros series 169 contains 70 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-34	2635 Jun 22 17:24:39	2102	7859	Nb	t-	-1.5336	0.0567	-0.9688	70.0	-	-		
02	-33	2653 Jul 03 00:17:37	2197	8082	N	t-	-1.4619	0.1895	-0.8384	126.9	-	-		
03	-32	2671 Jul 14 07:06:49	2294	8305	N	t-	-1.3877	0.3272	-0.7036	165.3	-	-		
04	-31	2689 Jul 24 13:53:09	2393	8528	N	t-	-1.3117	0.4683	-0.5658	195.9	-	-		
05	-30	2707 Aug 05 20:39:14	2494	8751	N	t-	-1.2359	0.6093	-0.4287	221.3	-	-		
06	-29	2725 Aug 16 03:25:48	2597	8974	N	t-	-1.1611	0.7487	-0.2935	242.9	-	-		
07	-28	2743 Aug 27 10:15:10	2702	9197	N	t-	-1.0886	0.8839	-0.1628	261.4	-	-		
08	-27	2761 Sep 06 17:07:18	2809	9420	Nx	t-	-1.0189	1.0143	-0.0373	277.3	-	-		
09	-26	2779 Sep 18 00:04:53	2919	9643	P	t-	-0.9540	1.1361	0.0793	290.8	67.5	-		
10	-25	2797 Sep 28 07:07:54	3030	9866	P	t-	-0.8938	1.2491	0.1870	302.3	102.3	-		
11	-24	2815 Oct 09 14:17:15	3143	10089	P	t-	-0.8391	1.3523	0.2848	312.0	124.8	-		
12	-23	2833 Oct 19 21:34:09	3259	10312	P	t-	-0.7907	1.4438	0.3709	320.2	140.9	-		
13	-22	2851 Oct 31 04:58:44	3377	10535	P	t-	-0.7487	1.5235	0.4454	327.0	152.9	-		
14	-21	2869 Nov 10 12:31:37	3496	10758	P	t-	-0.7140	1.5898	0.5067	332.4	161.8	-		
15	-20	2887 Nov 21 20:10:22	3618	10981	P	t-	-0.6842	1.6467	0.5589	337.0	168.7	-		
16	-19	2905 Dec 03 03:57:28	3742	11204	P	t-	-0.6616	1.6904	0.5984	340.5	173.7	-		
17	-18	2923 Dec 14 11:49:27	3868	11427	P	t-	-0.6429	1.7265	0.6309	343.4	177.6	-		

18	-17	2941	Dec 24	19:47:18	3996	11650	P	t-	-0.6294	1.7528	0.6542	345.6	180.4	-
19	-16	2960	Jan 05	03:46:50	4126	11873	P	t-	-0.6174	1.7759	0.6749	347.5	182.8	-
20	-15	2978	Jan 15	11:50:00	4258	12096	P	t-	-0.6086	1.7930	0.6904	348.9	184.5	-
21	-14	2996	Jan 26	19:52:23	4392	12319	P	t-	-0.5990	1.8109	0.7075	350.2	186.4	-
22	-13	3014	Feb 07	03:54:01	4528	12542	P	t-	-0.5890	1.8293	0.7259	351.4	188.3	-
23	-12	3032	Feb 18	11:52:02	4667	12765	P	t-	-0.5760	1.8529	0.7502	352.8	190.8	-
24	-11	3050	Feb 28	19:46:36	4807	12988	P	t-	-0.5602	1.8812	0.7798	354.2	193.6	-
25	-10	3068	Mar 11	03:34:17	4950	13211	P	t-	-0.5387	1.9197	0.8203	356.0	197.2	-
26	-09	3086	Mar 22	11:15:39	5094	13434	P	t-	-0.5118	1.9677	0.8709	358.0	201.4	-
27	-08	3104	Apr 02	18:48:49	5241	13657	P	t-	-0.4781	2.0280	0.9342	360.2	206.2	-
28	-07	3122	Apr 14	02:14:52	5389	13880	T	t-	-0.4384	2.0991	1.0086	362.6	211.2	15.4
29	-06	3140	Apr 24	09:30:29	5540	14103	T	t-	-0.3901	2.1860	1.0991	365.2	216.6	50.6
30	-05	3158	May 05	16:39:06	5693	14326	T	t-	-0.3361	2.2833	1.2000	367.6	221.7	69.5
31	-04	3176	May 15	23:38:16	5848	14549	T	pp	-0.2741	2.3951	1.3156	369.8	226.5	83.7
32	-03	3194	May 27	06:31:56	6005	14772	T	pp	-0.2072	2.5160	1.4402	371.5	230.4	94.1
33	-02	3212	Jun 06	13:16:32	6164	14995	T	pp	-0.1327	2.6509	1.5785	372.7	233.3	101.5
34	-01	3230	Jun 17	19:58:13	6325	15218	T	pp	-0.0556	2.7907	1.7216	372.9	234.9	105.5
35	00	3248	Jun 28	02:33:51	6488	15441	T+	pp	0.0264	2.8429	1.7768	372.2	235.0	106.1
36	01	3266	Jul 09	09:08:34	6654	15664	T+	pp	0.1097	2.6887	1.6253	370.5	233.3	103.1
37	02	3284	Jul 19	15:40:08	6821	15887	T+	pp	0.1960	2.5291	1.4680	367.6	229.9	95.6
38	03	3302	Jul 31	22:13:51	6990	16110	T	pp	0.2811	2.3720	1.3129	363.7	224.6	83.0
39	04	3320	Aug 11	04:48:36	7162	16333	T	-t	0.3655	2.2163	1.1588	358.6	217.4	62.3
40	05	3338	Aug 22	11:26:48	7335	16556	T	-t	0.4477	2.0649	1.0086	352.6	208.4	15.2
41	06	3356	Sep 01	18:09:47	7511	16779	P	-t	0.5263	1.9202	0.8647	345.7	197.7	-
42	07	3374	Sep 13	00:59:06	7689	17002	P	-t	0.6003	1.7841	0.7291	338.2	185.5	-
43	08	3392	Sep 23	07:56:09	7868	17225	P	-t	0.6687	1.6586	0.6038	330.4	171.9	-
44	09	3410	Oct 05	15:00:33	8050	17448	P	-t	0.7315	1.5434	0.4886	322.3	157.1	-
45	10	3428	Oct 15	22:14:31	8234	17671	P	-t	0.7870	1.4417	0.3866	314.5	141.6	-

46	11	3446	Oct 27	05:37:16	8420	17894	P	-t	0.8359	1.3521	0.2967	306.9	125.4	-
47	12	3464	Nov 06	13:09:48	8608	18117	P	-t	0.8775	1.2759	0.2202	299.9	109.0	-
48	13	3482	Nov 17	20:51:27	8798	18340	P	-t	0.9123	1.2121	0.1563	293.6	92.4	-
49	14	3500	Nov 29	04:43:06	8991	18563	P	-t	0.9398	1.1617	0.1059	288.2	76.4	-
50	15	3518	Dec 10	12:43:03	9185	18786	P	-t	0.9610	1.1226	0.0671	283.7	61.0	-
51	16	3536	Dec 20	20:50:30	9381	19009	P	-t	0.9769	1.0931	0.0381	280.0	46.0	-
52	17	3555	Jan 01	05:04:35	9580	19232	P	-h	0.9882	1.0717	0.0179	277.1	31.5	-
53	18	3573	Jan 11	13:24:33	9780	19455	P	-h	0.9958	1.0571	0.0048	274.7	16.3	-
54	19	3591	Jan 22	21:47:36	9983	19678	Nx	-h	1.0015	1.0455	-0.0045	272.7	-	-
55	20	3609	Feb 02	06:13:06	10187	19901	Nx	-h	1.0059	1.0361	-0.0113	270.8	-	-
56	21	3627	Feb 13	14:38:49	10394	20124	Nx	-h	1.0110	1.0250	-0.0190	268.7	-	-
57	22	3645	Feb 23	23:04:50	10603	20347	Nx	-h	1.0167	1.0125	-0.0275	266.4	-	-
58	23	3663	Mar 07	07:26:39	10814	20570	N	-h	1.0266	0.9921	-0.0434	263.2	-	-
59	24	3681	Mar 17	15:46:13	11027	20793	N	-h	1.0390	0.9669	-0.0636	259.5	-	-
60	25	3699	Mar 28	23:59:34	11242	21016	N	-h	1.0569	0.9313	-0.0938	254.5	-	-
61	26	3717	Apr 09	08:08:34	11459	21239	N	-h	1.0790	0.8879	-0.1316	248.6	-	-
62	27	3735	Apr 20	16:09:20	11678	21462	N	-h	1.1085	0.8308	-0.1828	240.8	-	-
63	28	3753	May 01	00:05:31	11899	21685	N	-h	1.1423	0.7658	-0.2419	231.7	-	-
64	29	3771	May 12	07:53:51	12122	21908	N	-h	1.1828	0.6884	-0.3134	220.5	-	-
65	30	3789	May 22	15:36:20	12348	22131	N	-h	1.2287	0.6013	-0.3947	206.9	-	-
66	31	3807	Jun 03	23:12:02	12575	22354	N	-h	1.2804	0.5036	-0.4868	190.4	-	-
67	32	3825	Jun 14	06:43:41	12805	22577	N	-a	1.3360	0.3990	-0.5860	170.4	-	-
68	33	3843	Jun 25	14:10:43	13036	22800	N	-a	1.3959	0.2866	-0.6935	145.4	-	-
69	34	3861	Jul 05	21:34:16	13270	23023	N	-a	1.4589	0.1686	-0.8071	112.3	-	-
70	35	3879	Jul 17	04:56:09	13506	23246	Ne	-a	1.5238	0.0476	-0.9241	60.1	-	-

SAROS SERIES

170

Saros series 170 contains 71 lunar eclipses.

													PHASE
													DURATIONS
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-35	2664 Jun 01	00:26:03	2255	8217	Nb t-	1.5565	0.0287	-1.0247	51.5	-	-	
02	-34	2682 Jun 12	07:13:50	2353	8440	N t-	1.4794	0.1679	-0.8809	122.4	-	-	
03	-33	2700 Jun 23	13:59:43	2454	8663	N t-	1.3996	0.3122	-0.7324	164.2	-	-	
04	-32	2718 Jul 04	20:42:24	2556	8886	N t-	1.3161	0.4636	-0.5772	196.5	-	-	
05	-31	2736 Jul 15	03:26:59	2660	9109	N t-	1.2326	0.6151	-0.4222	222.2	-	-	
06	-30	2754 Jul 26	10:12:00	2767	9332	N t-	1.1479	0.7689	-0.2655	243.8	-	-	
07	-29	2772 Aug 05	17:00:33	2875	9555	N t-	1.0649	0.9201	-0.1118	261.6	-	-	
08	-28	2790 Aug 16	23:52:50	2986	9778	P t-	0.9836	1.0681	0.0383	276.5	46.3	-	
09	-27	2808 Aug 27	06:51:56	3098	10001	P t-	0.9066	1.2086	0.1804	288.7	98.1	-	
10	-26	2826 Sep 07	13:57:35	3213	10224	P h-	0.8337	1.3417	0.3147	298.6	126.6	-	
11	-25	2844 Sep 17	21:10:30	3330	10447	P h-	0.7655	1.4664	0.4403	306.7	146.5	-	
12	-24	2862 Sep 29	04:32:10	3449	10670	P a-	0.7036	1.5797	0.5542	313.0	160.9	-	
13	-23	2880 Oct 09	12:03:07	3570	10893	P a-	0.6484	1.6809	0.6557	317.8	171.6	-	

14	-22	2898	Oct 20	19:43:17	3693	11116	P	a-	0.5999	1.7697	0.7448	321.5	179.7	-
15	-21	2916	Nov 01	03:32:55	3818	11339	P	a-	0.5585	1.8456	0.8208	324.1	185.6	-
16	-20	2934	Nov 12	11:32:00	3945	11562	P	a-	0.5241	1.9087	0.8842	325.9	189.9	-
17	-19	2952	Nov 22	19:40:25	4074	11785	P	a-	0.4967	1.9587	0.9345	327.0	192.9	-
18	-18	2970	Dec 04	03:55:41	4205	12008	P	a-	0.4745	1.9991	0.9756	327.5	195.0	-
19	-17	2988	Dec 14	12:19:11	4339	12231	T	a-	0.4584	2.0282	1.0056	327.6	196.3	11.6
20	-16	3006	Dec 26	20:47:49	4474	12454	T	a-	0.4463	2.0497	1.0285	327.3	197.2	26.0
21	-15	3025	Jan 06	05:22:02	4612	12677	T	a-	0.4379	2.0642	1.0447	326.7	197.6	32.3
22	-14	3043	Jan 17	13:57:30	4751	12900	T	a-	0.4301	2.0774	1.0603	326.1	197.9	37.2
23	-13	3061	Jan 27	22:36:14	4893	13123	T	a-	0.4244	2.0865	1.0722	325.3	198.1	40.5
24	-12	3079	Feb 08	07:13:53	5037	13346	T	a-	0.4175	2.0974	1.0865	324.5	198.4	44.0
25	-11	3097	Feb 18	15:50:31	5183	13569	T	a-	0.4089	2.1112	1.1042	323.8	198.9	48.0
26	-10	3115	Mar 03	00:22:50	5330	13792	T	a-	0.3963	2.1321	1.1293	323.2	199.7	52.9
27	-09	3133	Mar 13	08:52:01	5480	14015	T	a-	0.3804	2.1589	1.1608	322.8	200.8	58.3
28	-08	3151	Mar 24	17:15:04	5632	14238	T	p-	0.3591	2.1955	1.2023	322.6	202.2	64.4
29	-07	3169	Apr 04	01:32:12	5787	14461	T	p-	0.3324	2.2420	1.2540	322.6	204.0	70.9
30	-06	3187	Apr 15	09:42:20	5943	14684	T	p-	0.2993	2.3001	1.3173	322.8	206.0	77.4
31	-05	3205	Apr 25	17:46:21	6101	14907	T+	p-	0.2604	2.3688	1.3912	323.0	208.0	83.6
32	-04	3223	May 07	01:42:32	6261	15130	T+	p-	0.2146	2.4503	1.4778	323.3	210.0	89.3
33	-03	3241	May 17	09:32:45	6424	15353	T+	p-	0.1632	2.5422	1.5745	323.4	211.8	94.0
34	-02	3259	May 28	17:16:41	6588	15576	T+	p-	0.1060	2.6448	1.6817	323.3	213.0	97.5
35	-01	3277	Jun 08	00:56:30	6755	15799	T+	pp	0.0447	2.7551	1.7962	322.9	213.7	99.6
36	00	3295	Jun 19	08:30:20	6923	16022	T-	pp	-0.0221	2.7947	1.8395	322.0	213.5	99.9
37	01	3313	Jun 30	16:02:34	7094	16245	T-	pp	-0.0910	2.6668	1.7148	320.6	212.5	98.2
38	02	3331	Jul 11	23:31:14	7267	16468	T-	p	-0.1635	2.5324	1.5829	318.6	210.3	94.0
39	03	3349	Jul 22	07:00:15	7441	16691	T-	p	-0.2360	2.3983	1.4509	316.0	207.1	87.0
40	04	3367	Aug 02	14:27:18	7618	16914	T	p	-0.3107	2.2607	1.3146	312.6	202.6	76.3
41	05	3385	Aug 12	21:57:43	7797	17137	T	p	-0.3830	2.1277	1.1824	308.7	197.0	60.6

42	06	3403	Aug 25	05:29:08	7978	17360	T	-a	-0.4549	1.9957	1.0505	304.2	190.1	33.1	
43	07	3421	Sep 04	13:04:44	8161	17583	P	-a	-0.5234	1.8701	0.9246	299.2	182.3	-	
44	08	3439	Sep 15	20:44:03	8347	17806	P	-a	-0.5889	1.7504	0.8038	293.8	173.4	-	
45	09	3457	Sep 26	04:29:39	8534	18029	P	-a	-0.6492	1.6405	0.6925	288.3	163.8	-	
46	10	3475	Oct 07	12:20:53	8723	18252	P	-a	-0.7049	1.5392	0.5893	282.8	153.5	-	
47	11	3493	Oct 17	20:18:09	8914	18475	P	-a	-0.7558	1.4470	0.4948	277.3	142.7	-	
48	12	3511	Oct 30	04:23:06	9108	18698	P	-a	-0.8002	1.3668	0.4121	272.2	131.8	-	
49	13	3529	Nov 09	12:35:08	9303	18921	P	-a	-0.8386	1.2976	0.3402	267.5	121.0	-	
50	14	3547	Nov 20	20:54:54	9501	19144	P	-a	-0.8708	1.2400	0.2797	263.4	110.7	-	
51	15	3565	Dec 01	05:21:01	9701	19367	P	-a	-0.8978	1.1919	0.2289	259.8	100.9	-	
52	16	3583	Dec 12	13:54:47	9903	19590	P	-a	-0.9186	1.1550	0.1893	257.1	92.3	-	
53	17	3601	Dec 22	22:33:38	10106	19813	P	-a	-0.9353	1.1257	0.1575	254.9	84.6	-	
54	18	3620	Jan 03	07:17:32	10312	20036	P	-a	-0.9478	1.1039	0.1334	253.3	78.2	-	
55	19	3638	Jan 13	16:04:46	10520	20259	P	-a	-0.9577	1.0867	0.1144	252.1	72.6	-	
56	20	3656	Jan 25	00:55:01	10730	20482	P	-a	-0.9649	1.0742	0.1003	251.3	68.2	-	
57	21	3674	Feb 04	09:45:16	10942	20705	P	-a	-0.9722	1.0613	0.0864	250.4	63.5	-	
58	22	3692	Feb 15	18:35:04	11157	20928	P	-a	-0.9799	1.0476	0.0720	249.5	58.1	-	
59	23	3710	Feb 27	03:22:16	11373	21151	P	-a	-0.9894	1.0302	0.0544	248.2	50.7	-	
60	24	3728	Mar 09	12:06:48	11591	21374	P	-a	-1.0009	1.0092	0.0334	246.5	39.9	-	
61	25	3746	Mar 20	20:44:44	11811	21597	P	-a	-1.0177	0.9782	0.0028	243.9	11.6	-	
62	26	3764	Mar 31	05:17:46	12034	21820	N	-a	-1.0382	0.9402	-0.0346	240.4	-	-	
63	27	3782	Apr 11	13:42:37	12259	22043	N	-a	-1.0653	0.8901	-0.0840	235.5	-	-	
64	28	3800	Apr 22	22:01:33	12485	22266	N	-a	-1.0969	0.8318	-0.1415	229.5	-	-	
65	29	3818	May 04	06:10:14	12714	22489	N	-a	-1.1365	0.7588	-0.2138	221.2	-	-	
66	30	3836	May 14	14:12:48	12945	22712	N	-a	-1.1808	0.6772	-0.2949	211.2	-	-	
67	31	3854	May 25	22:05:36	13177	22935	N	-a	-1.2330	0.5812	-0.3905	198.0	-	-	
68	32	3872	Jun 05	05:52:16	13412	23158	N	-a	-1.2896	0.4773	-0.4943	181.7	-	-	
69	33	3890	Jun 16	13:29:54	13649	23381	N	-a	-1.3531	0.3610	-0.6110	160.2	-	-	

70	34	3908	Jun 27	21:02:59	13888	23604	N	-a	-1.4197	0.2392	-0.7336	132.2	-	-
71	35	3926	Jul 09	04:29:17	14130	23827	N	-a	-1.4912	0.1086	-0.8655	90.4	-	-

SAROS SERIES

171

Saros series 171 contains 71 lunar eclipses.

													PHASE	
													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-37	2675 May 01	21:07:16	2314	8352	Nb a-	-1.5178	0.0500	-0.9046	59.7	-	-		
02	-36	2693 May 12	05:00:40	2414	8575	N a-	-1.4659	0.1435	-0.8076	100.1	-	-		
03	-35	2711 May 24	12:47:50	2515	8798	N a-	-1.4090	0.2463	-0.7018	129.8	-	-		
04	-34	2729 Jun 03	20:29:16	2619	9021	N a-	-1.3473	0.3582	-0.5872	154.7	-	-		
05	-33	2747 Jun 15	04:06:13	2724	9244	N a-	-1.2818	0.4774	-0.4659	176.4	-	-		
06	-32	2765 Jun 25	11:39:32	2832	9467	N a-	-1.2132	0.6024	-0.3393	195.6	-	-		
07	-31	2783 Jul 06	19:11:10	2942	9690	N a-	-1.1430	0.7309	-0.2100	212.7	-	-		

08	-30	2801	Jul 17	02:40:12	3054	9913	N	a-	-1.0705	0.8637	-0.0768	228.0	-	-
09	-29	2819	Jul 28	10:10:35	3168	10136	P	a-	-0.9992	0.9947	0.0538	241.4	50.2	-
10	-28	2837	Aug 07	17:40:59	3284	10359	P	a-	-0.9279	1.1261	0.1842	253.3	91.2	-
11	-27	2855	Aug 19	01:14:47	3402	10582	P	a-	-0.8594	1.2526	0.3091	263.6	116.1	-
12	-26	2873	Aug 29	08:50:19	3522	10805	P	a-	-0.7924	1.3766	0.4310	272.8	134.8	-
13	-25	2891	Sep 09	16:31:35	3644	11028	P	a-	-0.7303	1.4918	0.5435	280.5	148.9	-
14	-24	2909	Sep 21	00:16:53	3768	11251	P	a-	-0.6720	1.6003	0.6488	287.2	160.1	-
15	-23	2927	Oct 02	08:08:17	3895	11474	P	a-	-0.6192	1.6991	0.7441	292.9	168.9	-
16	-22	2945	Oct 12	16:05:42	4023	11697	P	a-	-0.5716	1.7885	0.8295	297.7	176.0	-
17	-21	2963	Oct 24	00:10:50	4153	11920	P	a-	-0.5306	1.8657	0.9027	301.8	181.5	-
18	-20	2981	Nov 03	08:22:42	4286	12143	P	a-	-0.4957	1.9318	0.9645	305.1	185.8	-
19	-19	2999	Nov 14	16:41:25	4421	12366	T	a-	-0.4669	1.9868	1.0153	308.0	189.1	18.5
20	-18	3017	Nov 26	01:06:47	4557	12589	T	p-	-0.4440	2.0309	1.0552	310.3	191.6	34.7
21	-17	3035	Dec 07	09:38:44	4696	12812	T	p-	-0.4267	2.0647	1.0851	312.3	193.5	42.8
22	-16	3053	Dec 17	18:15:16	4837	13035	T	p-	-0.4136	2.0907	1.1074	314.0	194.9	47.8
23	-15	3071	Dec 29	02:56:36	4980	13258	T	p-	-0.4046	2.1088	1.1220	315.4	196.0	50.8
24	-14	3090	Jan 08	11:40:20	5125	13481	T	p-	-0.3980	2.1225	1.1328	316.7	196.9	52.8
25	-13	3108	Jan 20	20:26:23	5272	13704	T	p-	-0.3936	2.1317	1.1395	317.9	197.6	54.1
26	-12	3126	Jan 31	05:10:58	5421	13927	T	p-	-0.3884	2.1424	1.1482	319.0	198.4	55.7
27	-11	3144	Feb 11	13:55:25	5572	14150	T	p-	-0.3834	2.1522	1.1565	320.2	199.2	57.2
28	-10	3162	Feb 21	22:35:26	5725	14373	T	p-	-0.3752	2.1680	1.1711	321.5	200.3	59.7
29	-09	3180	Mar 04	07:11:39	5881	14596	T	p-	-0.3644	2.1881	1.1904	322.9	201.7	62.7
30	-08	3198	Mar 15	15:40:25	6038	14819	T	p-	-0.3480	2.2185	1.2203	324.6	203.5	67.0
31	-07	3216	Mar 26	00:03:32	6198	15042	T	p-	-0.3276	2.2559	1.2576	326.5	205.6	71.7
32	-06	3234	Apr 06	08:17:56	6359	15265	T	p-	-0.3004	2.3059	1.3075	328.6	208.1	77.2
33	-05	3252	Apr 16	16:23:56	6523	15488	T-	p-	-0.2671	2.3671	1.3686	330.8	210.8	82.9
34	-04	3270	Apr 28	00:20:35	6689	15711	T-	p-	-0.2267	2.4413	1.4427	333.2	213.6	88.6
35	-03	3288	May 08	08:08:58	6856	15934	T-	pp	-0.1802	2.5266	1.5279	335.6	216.3	93.7

36	-02	3306	May 20	15:48:20	7026	16157	T-	pp	-0.1268	2.6248	1.6257	337.8	218.7	98.0
37	-01	3324	May 30	23:19:14	7198	16380	T-	pp	-0.0670	2.7348	1.7350	339.8	220.7	101.1
38	00	3342	Jun 11	06:42:41	7372	16603	T-	pp	-0.0018	2.8552	1.8542	341.3	221.8	102.4
39	01	3360	Jun 21	13:59:42	7548	16826	T+	pp	0.0677	2.7350	1.7325	342.3	222.0	101.6
40	02	3378	Jul 02	21:10:03	7726	17049	T+	pp	0.1420	2.5996	1.5952	342.5	221.0	98.0
41	03	3396	Jul 13	04:15:53	7907	17272	T+	-p	0.2193	2.4590	1.4521	342.0	218.6	91.0
42	04	3414	Jul 25	11:17:45	8089	17495	T	-a	0.2988	2.3146	1.3048	340.5	214.5	79.2
43	05	3432	Aug 04	18:18:17	8273	17718	T	-a	0.3785	2.1702	1.1569	338.0	208.8	59.9
44	06	3450	Aug 16	01:16:05	8460	17941	T	-h	0.4592	2.0240	1.0067	334.6	201.0	13.0
45	07	3468	Aug 26	08:15:44	8648	18164	P	-h	0.5373	1.8830	0.8613	330.3	191.5	-
46	08	3486	Sep 06	15:15:54	8839	18387	P	-h	0.6138	1.7451	0.7186	325.0	179.8	-
47	09	3504	Sep 17	22:20:12	9031	18610	P	-h	0.6859	1.6154	0.5836	319.2	166.2	-
48	10	3522	Sep 29	05:26:51	9226	18833	P	-h	0.7550	1.4913	0.4540	312.7	150.1	-
49	11	3540	Oct 09	12:40:00	9423	19056	P	-h	0.8179	1.3789	0.3359	305.9	131.8	-
50	12	3558	Oct 20	19:58:19	9622	19279	P	-h	0.8754	1.2763	0.2274	299.1	110.5	-
51	13	3576	Oct 31	03:23:02	9823	19502	P	-h	0.9269	1.1848	0.1300	292.3	85.0	-
52	14	3594	Nov 11	10:54:54	10026	19725	P	-h	0.9719	1.1052	0.0445	285.9	50.5	-
53	15	3612	Nov 21	18:34:14	10231	19948	Nx	-h	1.0104	1.0375	-0.0288	280.1	-	-
54	16	3630	Dec 03	02:21:01	10438	20171	N	-h	1.0419	0.9823	-0.0894	275.2	-	-
55	17	3648	Dec 13	10:12:46	10647	20394	N	-h	1.0689	0.9352	-0.1415	270.7	-	-
56	18	3666	Dec 24	18:11:21	10858	20617	N	-h	1.0898	0.8993	-0.1819	267.3	-	-
57	19	3685	Jan 04	02:13:46	11072	20840	N	-t	1.1073	0.8690	-0.2161	264.4	-	-
58	20	3703	Jan 16	10:20:05	11287	21063	N	-t	1.1210	0.8455	-0.2428	262.1	-	-
59	21	3721	Jan 26	18:27:05	11505	21286	N	-t	1.1338	0.8234	-0.2675	259.9	-	-
60	22	3739	Feb 07	02:35:29	11724	21509	N	-t	1.1449	0.8040	-0.2888	257.9	-	-
61	23	3757	Feb 17	10:41:32	11946	21732	N	-t	1.1574	0.7816	-0.3123	255.3	-	-
62	24	3775	Feb 28	18:44:46	12170	21955	N	-t	1.1717	0.7555	-0.3388	252.1	-	-
63	25	3793	Mar 11	02:42:56	12395	22178	N	-t	1.1897	0.7223	-0.3718	247.6	-	-

64	26	3811	Mar 23	10:36:05	12623	22401	N	-t	1.2113	0.6824	-0.4109	241.9	-	-
65	27	3829	Apr 02	18:20:50	12853	22624	N	-t	1.2392	0.6306	-0.4614	233.9	-	-
66	28	3847	Apr 14	01:58:31	13085	22847	N	-t	1.2723	0.5689	-0.5214	223.6	-	-
67	29	3865	Apr 24	09:26:52	13319	23070	N	-t	1.3124	0.4942	-0.5939	210.0	-	-
68	30	3883	May 05	16:47:56	13556	23293	N	-t	1.3581	0.4093	-0.6766	192.7	-	-
69	31	3901	May 16	23:57:46	13794	23516	N	-t	1.4121	0.3089	-0.7745	169.0	-	-
70	32	3919	May 28	07:01:10	14034	23739	N	-t	1.4707	0.2002	-0.8808	137.4	-	-
71	33	3937	Jun 07	13:54:49	14276	23962	Ne	-t	1.5362	0.0787	-0.9999	87.1	-	-

SAROS SERIES

172

Saros series 172 contains 70 lunar eclipses.

PHASE													
DURATIONS													
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-34	2758 May 15	07:26:11	2789	9379	Nb t-	1.5528	0.0238	-1.0064	45.4	-	-	-

02	-33	2776	May 25	14:39:01	2898	9602	N	t-	1.4962	0.1282	-0.9027	104.7	-	-
03	-32	2794	Jun 05	21:43:55	3009	9825	N	t-	1.4333	0.2441	-0.7880	143.4	-	-
04	-31	2812	Jun 16	04:41:48	3122	10048	N	t-	1.3655	0.3693	-0.6642	175.0	-	-
05	-30	2830	Jun 27	11:33:31	3238	10271	N	t-	1.2930	0.5032	-0.5321	202.5	-	-
06	-29	2848	Jul 07	18:21:12	3355	10494	N	t-	1.2176	0.6427	-0.3949	226.5	-	-
07	-28	2866	Jul 19	01:05:56	3474	10717	N	t-	1.1399	0.7866	-0.2538	247.9	-	-
08	-27	2884	Jul 29	07:47:55	3595	10940	N	t-	1.0605	0.9340	-0.1094	267.1	-	-
09	-26	2902	Aug 10	14:30:31	3719	11163	P	t-	0.9817	1.0803	0.0332	283.9	43.9	-
10	-25	2920	Aug 20	21:13:30	3844	11386	P	t-	0.9038	1.2254	0.1743	298.7	98.8	-
11	-24	2938	Sep 01	04:00:13	3972	11609	P	t-	0.8291	1.3646	0.3093	311.4	129.3	-
12	-23	2956	Sep 11	10:48:39	4102	11832	P	t-	0.7562	1.5006	0.4407	322.6	151.6	-
13	-22	2974	Sep 22	17:44:13	4233	12055	P	t-	0.6893	1.6258	0.5610	332.0	168.2	-
14	-21	2992	Oct 03	00:44:12	4367	12278	P	t-	0.6264	1.7438	0.6740	340.1	181.3	-
15	-20	3010	Oct 15	07:52:30	4503	12501	P	t-	0.5707	1.8485	0.7737	346.7	191.3	-
16	-19	3028	Oct 25	15:06:58	4641	12724	P	t-	0.5203	1.9435	0.8638	352.2	199.2	-
17	-18	3046	Nov 05	22:31:16	4781	12947	P	t-	0.4782	2.0231	0.9387	356.6	205.1	-
18	-17	3064	Nov 16	06:02:14	4923	13170	T	t-	0.4416	2.0925	1.0035	360.3	209.8	9.7
19	-16	3082	Nov 27	13:40:57	5067	13393	T	t-	0.4117	2.1496	1.0564	363.2	213.3	38.5
20	-15	3100	Dec 08	21:26:18	5214	13616	T	t-	0.3873	2.1962	1.0993	365.5	215.9	50.4
21	-14	3118	Dec 20	05:18:43	5362	13839	T	p-	0.3694	2.2306	1.1307	367.3	217.8	57.2
22	-13	3136	Dec 30	13:15:01	5512	14062	T	p-	0.3543	2.2594	1.1570	368.7	219.2	62.2
23	-12	3155	Jan 10	21:14:57	5665	14285	T	p-	0.3426	2.2818	1.1778	369.8	220.4	65.7
24	-11	3173	Jan 21	05:16:31	5819	14508	T	p-	0.3324	2.3011	1.1961	370.6	221.3	68.6
25	-10	3191	Feb 01	13:19:16	5976	14731	T	p-	0.3233	2.3177	1.2125	371.2	222.2	71.0
26	-09	3209	Feb 11	21:18:46	6135	14954	T	p-	0.3119	2.3384	1.2338	371.8	223.2	74.0
27	-08	3227	Feb 23	05:16:33	6295	15177	T	p-	0.2991	2.3613	1.2579	372.2	224.2	77.0
28	-07	3245	Mar 05	13:08:23	6458	15400	T	p-	0.2814	2.3927	1.2914	372.8	225.6	80.9
29	-06	3263	Mar 16	20:55:51	6623	15623	T+	p-	0.2601	2.4304	1.3317	373.3	227.1	85.0

30	-05	3281	Mar 27	04:34:26	6790	15846	T+	pp	0.2316	2.4813	1.3856	373.8	228.9	89.8
31	-04	3299	Apr 07	12:07:28	6959	16069	T+	pp	0.1982	2.5407	1.4486	374.3	230.6	94.4
32	-03	3317	Apr 18	19:31:02	7130	16292	T+	pp	0.1570	2.6145	1.5262	374.7	232.4	98.8
33	-02	3335	Apr 30	02:47:04	7303	16515	T+	pp	0.1091	2.7002	1.6161	374.8	233.9	102.5
34	-01	3353	May 10	09:54:12	7478	16738	T+	pp	0.0535	2.8001	1.7201	374.7	234.9	105.1
35	00	3371	May 21	16:54:55	7656	16961	T-	pp	-0.0078	2.8819	1.8061	373.9	235.1	105.9
36	01	3389	May 31	23:48:27	7835	17184	T-	pp	-0.0753	2.7559	1.6842	372.5	234.2	104.5
37	02	3407	Jun 13	06:35:49	8017	17407	T-	pp	-0.1484	2.6199	1.5521	370.3	232.0	100.1
38	03	3425	Jun 23	13:18:38	8200	17630	T-	pp	-0.2257	2.4761	1.4120	367.1	228.3	91.7
39	04	3443	Jul 04	19:57:48	8386	17853	T	pp	-0.3067	2.3258	1.2651	362.7	222.7	77.8
40	05	3461	Jul 15	02:34:43	8574	18076	T	-t	-0.3897	2.1719	1.1143	357.2	215.1	53.7
41	06	3479	Jul 26	09:10:34	8763	18299	P	-t	-0.4740	2.0159	0.9609	350.5	205.3	-
42	07	3497	Aug 05	15:47:56	8955	18522	P	-t	-0.5576	1.8613	0.8086	342.7	193.1	-
43	08	3515	Aug 17	22:27:38	9149	18745	P	-t	-0.6399	1.7093	0.6586	333.8	178.4	-
44	09	3533	Aug 28	05:10:30	9345	18968	P	-t	-0.7201	1.5614	0.5121	323.8	160.7	-
45	10	3551	Sep 08	11:59:06	9543	19191	P	-t	-0.7960	1.4216	0.3734	313.2	139.8	-
46	11	3569	Sep 18	18:53:38	9743	19414	P	-t	-0.8676	1.2899	0.2425	302.0	114.6	-
47	12	3587	Sep 30	01:56:27	9945	19637	P	-t	-0.9331	1.1694	0.1224	290.5	82.6	-
48	13	3605	Oct 10	09:06:19	10150	19860	P	-t	-0.9936	1.0583	0.0116	278.9	25.8	-
49	14	3623	Oct 21	16:26:32	10356	20083	N	-t	-1.0464	0.9614	-0.0853	267.8	-	-
50	15	3641	Oct 31	23:55:27	10564	20306	N	-t	-1.0928	0.8763	-0.1704	257.2	-	-
51	16	3659	Nov 12	07:34:29	10775	20529	N	-t	-1.1315	0.8052	-0.2415	247.6	-	-
52	17	3677	Nov 22	15:22:45	10987	20752	N	-t	-1.1635	0.7467	-0.3001	239.2	-	-
53	18	3695	Dec 03	23:20:25	11202	20975	N	-t	-1.1885	0.7005	-0.3460	232.0	-	-
54	19	3713	Dec 15	07:26:33	11419	21198	N	-h	-1.2074	0.6656	-0.3804	226.3	-	-
55	20	3731	Dec 26	15:38:59	11637	21421	N	-h	-1.2219	0.6386	-0.4065	221.5	-	-
56	21	3750	Jan 05	23:58:48	11858	21644	N	-h	-1.2310	0.6213	-0.4226	218.2	-	-
57	22	3768	Jan 17	08:22:43	12081	21867	N	-h	-1.2369	0.6095	-0.4326	215.7	-	-

58	23	3786	Jan 27	16:50:46	12306	22090	N	-h	-1.2406	0.6016	-0.4381	213.7	-	-
59	24	3804	Feb 09	01:19:03	12533	22313	N	-a	-1.2445	0.5930	-0.4438	211.6	-	-
60	25	3822	Feb 19	09:49:06	12762	22536	N	-a	-1.2476	0.5854	-0.4479	209.7	-	-
61	26	3840	Mar 01	18:16:58	12993	22759	N	-a	-1.2531	0.5735	-0.4558	207.0	-	-
62	27	3858	Mar 13	02:42:30	13227	22982	N	-a	-1.2610	0.5566	-0.4682	203.4	-	-
63	28	3876	Mar 23	11:03:23	13462	23205	N	-a	-1.2733	0.5315	-0.4884	198.5	-	-
64	29	3894	Apr 03	19:20:11	13699	23428	N	-a	-1.2899	0.4985	-0.5161	192.1	-	-
65	30	3912	Apr 15	03:30:33	13939	23651	N	-a	-1.3121	0.4549	-0.5540	183.5	-	-
66	31	3930	Apr 26	11:34:54	14181	23874	N	-a	-1.3397	0.4013	-0.6020	172.5	-	-
67	32	3948	May 06	19:32:26	14424	24097	N	-a	-1.3736	0.3363	-0.6612	158.2	-	-
68	33	3966	May 18	03:24:22	14670	24320	N	-a	-1.4125	0.2619	-0.7299	140.0	-	-
69	34	3984	May 28	11:08:36	14918	24543	N	-a	-1.4583	0.1751	-0.8111	115.0	-	-
70	35	4002	Jun 08	18:48:16	15167	24766	N	-a	-1.5081	0.0810	-0.8999	78.5	-	-

SAROS SERIES

173

Saros series 173 contains 72 lunar eclipses.

PHASE

DURATIONS

SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-34	2787 Apr 24	13:54:20	2965	9737	N t-	-1.5381	0.0689	-0.9971	79.8	-	-	
02	-33	2805 May 04	21:08:11	3078	9960	N t-	-1.4821	0.1689	-0.8915	123.4	-	-	
03	-32	2823 May 16	04:14:42	3192	10183	N t-	-1.4192	0.2815	-0.7734	157.0	-	-	
04	-31	2841 May 26	11:15:35	3308	10406	N t-	-1.3507	0.4045	-0.6451	185.4	-	-	
05	-30	2859 Jun 06	18:11:15	3427	10629	N t-	-1.2771	0.5370	-0.5075	210.1	-	-	
06	-29	2877 Jun 17	01:03:49	3547	10852	N t-	-1.1999	0.6762	-0.3635	231.7	-	-	
07	-28	2895 Jun 28	07:53:55	3670	11075	N t-	-1.1194	0.8218	-0.2135	250.7	-	-	
08	-27	2913 Jul 09	14:42:35	3795	11298	N t-	-1.0366	0.9716	-0.0597	267.4	-	-	
09	-26	2931 Jul 20	21:32:13	3921	11521	P t-	-0.9536	1.1222	0.0944	281.6	72.0	-	
10	-25	2949 Jul 31	04:23:42	4050	11744	P t-	-0.8712	1.2719	0.2471	293.7	113.7	-	
11	-24	2967 Aug 11	11:18:05	4181	11967	P h-	-0.7900	1.4195	0.3973	304.0	140.5	-	
12	-23	2985 Aug 21	18:16:56	4314	12190	P h-	-0.7114	1.5628	0.5427	312.4	160.0	-	
13	-22	3003 Sep 03	01:21:39	4449	12413	P h-	-0.6364	1.6995	0.6811	319.2	174.7	-	
14	-21	3021 Sep 13	08:33:59	4586	12636	P a-	-0.5669	1.8263	0.8092	324.5	185.8	-	
15	-20	3039 Sep 24	15:52:39	4726	12859	P a-	-0.5016	1.9457	0.9295	328.6	194.3	-	
16	-19	3057 Oct 04	23:21:22	4867	13082	T a-	-0.4437	2.0517	1.0360	331.5	200.5	29.5	
17	-18	3075 Oct 16	06:58:07	5010	13305	T a-	-0.3914	2.1474	1.1322	333.6	205.1	54.8	
18	-17	3093 Oct 26	14:45:49	5156	13528	T a-	-0.3473	2.2283	1.2133	334.9	208.3	67.5	
19	-16	3111 Nov 07	22:41:00	5303	13751	T p-	-0.3086	2.2992	1.2844	335.7	210.6	75.9	
20	-15	3129 Nov 18	06:46:58	5453	13974	T p-	-0.2780	2.3552	1.3407	335.9	212.0	81.1	
21	-14	3147 Nov 29	15:00:07	5604	14197	T- p-	-0.2526	2.4016	1.3874	335.8	212.9	84.8	
22	-13	3165 Dec 09	23:21:45	5758	14420	T- p-	-0.2335	2.4364	1.4228	335.4	213.3	87.1	
23	-12	3183 Dec 21	07:49:15	5914	14643	T- p-	-0.2186	2.4632	1.4505	334.9	213.5	88.7	
24	-11	3201 Dec 31	16:23:14	6072	14866	T- p-	-0.2083	2.4814	1.4701	334.2	213.4	89.7	

25	-10	3220	Jan 12	01:00:30	6232	15089	T-	p-	-0.2005	2.4950	1.4854	333.3	213.3	90.4
26	-09	3238	Jan 22	09:40:19	6394	15312	T-	p-	-0.1940	2.5057	1.4984	332.4	213.1	90.9
27	-08	3256	Feb 02	18:20:53	6558	15535	T-	p-	-0.1876	2.5160	1.5114	331.5	212.9	91.5
28	-07	3274	Feb 13	03:01:37	6724	15758	T-	p-	-0.1806	2.5273	1.5259	330.5	212.8	92.1
29	-06	3292	Feb 24	11:39:09	6892	15981	T-	p-	-0.1705	2.5440	1.5463	329.6	212.8	92.9
30	-05	3310	Mar 07	20:13:54	7062	16204	T-	p-	-0.1576	2.5656	1.5720	328.7	212.8	93.9
31	-04	3328	Mar 18	04:43:27	7235	16427	T-	p-	-0.1397	2.5962	1.6070	327.9	213.1	95.2
32	-03	3346	Mar 29	13:08:49	7409	16650	T-	p-	-0.1177	2.6341	1.6496	327.1	213.3	96.5
33	-02	3364	Apr 08	21:26:05	7586	16873	T-	p-	-0.0884	2.6854	1.7058	326.4	213.6	97.9
34	-01	3382	Apr 20	05:38:24	7764	17096	T-	pp	-0.0545	2.7452	1.7705	325.5	213.9	99.0
35	00	3400	May 01	13:42:40	7945	17319	T-	pp	-0.0135	2.8181	1.8481	324.6	213.9	99.6
36	01	3418	May 12	21:41:20	8128	17542	T+	pp	0.0327	2.7804	1.8151	323.5	213.5	99.5
37	02	3436	May 23	05:32:10	8312	17765	T+	pp	0.0860	2.6804	1.7195	322.0	212.6	98.1
38	03	3454	Jun 03	13:18:34	8499	17988	T+	pp	0.1433	2.5732	1.6164	320.2	211.0	95.2
39	04	3472	Jun 13	20:59:08	8688	18211	T+	-p	0.2057	2.4568	1.5036	317.9	208.6	90.1
40	05	3490	Jun 25	04:35:13	8879	18434	T+	-p	0.2723	2.3330	1.3831	314.9	205.0	82.2
41	06	3508	Jul 06	12:07:53	9072	18657	T	-p	0.3419	2.2040	1.2567	311.3	200.3	70.2
42	07	3526	Jul 17	19:38:35	9267	18880	T	-a	0.4133	2.0720	1.1267	307.0	194.3	51.4
43	08	3544	Jul 28	03:08:24	9465	19103	P	-a	0.4858	1.9383	0.9944	302.0	186.9	-
44	09	3562	Aug 08	10:37:34	9664	19326	P	-a	0.5588	1.8038	0.8608	296.2	177.9	-
45	10	3580	Aug 18	18:09:00	9865	19549	P	-a	0.6302	1.6728	0.7300	289.8	167.3	-
46	11	3598	Aug 30	01:42:30	10069	19772	P	-a	0.6997	1.5454	0.6021	282.8	155.0	-
47	12	3616	Sep 09	09:19:33	10274	19995	P	-a	0.7666	1.4232	0.4790	275.4	140.8	-
48	13	3634	Sep 20	17:00:27	10482	20218	P	-a	0.8303	1.3070	0.3613	267.5	124.4	-
49	14	3652	Oct 01	00:47:35	10691	20441	P	-a	0.8890	1.2003	0.2525	259.6	105.7	-
50	15	3670	Oct 12	08:40:34	10903	20664	P	-a	0.9426	1.1031	0.1530	251.7	83.4	-
51	16	3688	Oct 22	16:39:40	11117	20887	P	-a	0.9914	1.0151	0.0622	243.9	53.8	-
52	17	3706	Nov 04	00:46:12	11333	21110	N	-a	1.0339	0.9386	-0.0173	236.7	-	-

53	18	3724	Nov 14	09:00:08	11551	21333	N	-a	1.0706	0.8728	-0.0863	230.1	-	-
54	19	3742	Nov 25	17:21:07	11771	21556	N	-a	1.1013	0.8181	-0.1442	224.3	-	-
55	20	3760	Dec 06	01:48:17	11993	21779	N	-a	1.1270	0.7726	-0.1929	219.3	-	-
56	21	3778	Dec 17	10:21:57	12217	22002	N	-a	1.1474	0.7368	-0.2318	215.2	-	-
57	22	3796	Dec 27	19:01:16	12443	22225	N	-a	1.1633	0.7090	-0.2624	212.1	-	-
58	23	3815	Jan 09	03:44:10	12672	22448	N	-a	1.1763	0.6863	-0.2875	209.5	-	-
59	24	3833	Jan 19	12:31:12	12902	22671	N	-a	1.1861	0.6695	-0.3066	207.6	-	-
60	25	3851	Jan 30	21:19:23	13134	22894	N	-a	1.1951	0.6538	-0.3240	205.8	-	-
61	26	3869	Feb 10	06:09:02	13369	23117	N	-a	1.2028	0.6404	-0.3387	204.3	-	-
62	27	3887	Feb 21	14:55:49	13606	23340	N	-a	1.2130	0.6222	-0.3579	202.1	-	-
63	28	3905	Mar 04	23:41:52	13844	23563	N	-a	1.2236	0.6029	-0.3778	199.6	-	-
64	29	3923	Mar 16	08:22:42	14085	23786	N	-a	1.2388	0.5752	-0.4056	195.9	-	-
65	30	3941	Mar 26	16:59:12	14328	24009	N	-a	1.2571	0.5415	-0.4393	191.0	-	-
66	31	3959	Apr 07	01:28:01	14573	24232	N	-a	1.2814	0.4968	-0.4837	184.1	-	-
67	32	3977	Apr 17	09:51:01	14820	24455	N	-a	1.3102	0.4437	-0.5363	175.2	-	-
68	33	3995	Apr 28	18:05:22	15069	24678	N	-a	1.3457	0.3784	-0.6011	163.2	-	-
69	34	4013	May 09	02:11:34	15320	24901	N	-a	1.3872	0.3019	-0.6772	147.1	-	-
70	35	4031	May 20	10:09:05	15573	25124	N	-a	1.4353	0.2137	-0.7652	125.1	-	-
71	36	4049	May 30	17:59:06	15828	25347	N	-a	1.4885	0.1159	-0.8629	93.2	-	-
72	37	4067	Jun 11	01:40:30	16085	25570	Ne	-a	1.5481	0.0068	-0.9724	22.8	-	-

SAROS SERIES

174

Saros series 174 contains 79 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-46	2635 Dec 16	02:16:39	2105	7865	N a-	1.5481	0.0105	-0.9760	28.1	-	-		
02	-45	2653 Dec 26	11:00:19	2199	8088	N a-	1.5371	0.0304	-0.9555	47.5	-	-		
03	-44	2672 Jan 06	19:46:59	2296	8311	N a-	1.5285	0.0455	-0.9392	57.9	-	-		
04	-43	2690 Jan 17	04:35:17	2395	8534	N a-	1.5212	0.0581	-0.9249	65.3	-	-		
05	-42	2708 Jan 29	13:24:03	2496	8757	N a-	1.5145	0.0694	-0.9117	71.1	-	-		
06	-41	2726 Feb 08	22:10:40	2600	8980	N a-	1.5059	0.0840	-0.8946	78.0	-	-		
07	-40	2744 Feb 20	06:54:26	2705	9203	N a-	1.4949	0.1027	-0.8731	85.9	-	-		
08	-39	2762 Mar 02	15:33:55	2812	9426	N a-	1.4806	0.1274	-0.8452	95.2	-	-		
09	-38	2780 Mar 13	00:09:05	2922	9649	N a-	1.4629	0.1581	-0.8111	105.6	-	-		
10	-37	2798 Mar 24	08:36:37	3033	9872	N a-	1.4388	0.2004	-0.7651	118.3	-	-		
11	-36	2816 Apr 03	16:58:39	3146	10095	N a-	1.4103	0.2509	-0.7111	131.5	-	-		
12	-35	2834 Apr 15	01:12:29	3262	10318	N a-	1.3749	0.3141	-0.6442	146.0	-	-		
13	-34	2852 Apr 25	09:20:36	3380	10541	N a-	1.3349	0.3856	-0.5692	160.5	-	-		
14	-33	2870 May 06	17:19:39	3499	10764	N a-	1.2875	0.4710	-0.4806	175.7	-	-		
15	-32	2888 May 17	01:13:49	3621	10987	N a-	1.2361	0.5640	-0.3847	190.3	-	-		
16	-31	2906 May 29	09:00:23	3745	11210	N a-	1.1780	0.6692	-0.2770	205.0	-	-		
17	-30	2924 Jun 08	16:42:16	3871	11433	N a-	1.1163	0.7815	-0.1626	218.9	-	-		

18	-29	2942	Jun 20	00:18:29	3999	11656	N	a-	1.0497	0.9029	-0.0397	232.3	-	-
19	-28	2960	Jun 30	07:52:16	4129	11879	P	a-	0.9811	1.0283	0.0866	244.6	63.4	-
20	-27	2978	Jul 11	15:23:03	4261	12102	P	a-	0.9099	1.1587	0.2173	256.0	98.6	-
21	-26	2996	Jul 21	22:52:28	4396	12325	P	a-	0.8376	1.2915	0.3499	266.4	122.8	-
22	-25	3014	Aug 03	06:21:54	4532	12548	P	a-	0.7653	1.4248	0.4822	275.8	141.5	-
23	-24	3032	Aug 13	13:52:30	4670	12771	P	a-	0.6938	1.5567	0.6125	284.1	156.4	-
24	-23	3050	Aug 24	21:25:09	4811	12994	P	a-	0.6243	1.6853	0.7390	291.4	168.4	-
25	-22	3068	Sep 04	05:00:45	4953	13217	P	a-	0.5574	1.8095	0.8604	297.7	178.2	-
26	-21	3086	Sep 15	12:41:15	5098	13440	P	a-	0.4946	1.9263	0.9739	303.1	186.1	-
27	-20	3104	Sep 26	20:26:57	5245	13663	T	a-	0.4364	2.0351	1.0790	307.7	192.4	41.2
28	-19	3122	Oct 08	04:17:59	5393	13886	T	p-	0.3829	2.1351	1.1751	311.6	197.4	59.6
29	-18	3140	Oct 18	12:16:10	5544	14109	T	p-	0.3358	2.2238	1.2594	314.9	201.2	70.7
30	-17	3158	Oct 29	20:20:53	5697	14332	T	p-	0.2949	2.3012	1.3323	317.6	204.2	78.1
31	-16	3176	Nov 09	04:33:10	5852	14555	T+	p-	0.2604	2.3668	1.3933	319.9	206.4	83.1
32	-15	3194	Nov 20	12:50:36	6009	14778	T+	p-	0.2306	2.4237	1.4456	322.0	208.2	86.8
33	-14	3212	Nov 30	21:15:57	6168	15001	T+	p-	0.2082	2.4672	1.4846	323.7	209.5	89.2
34	-13	3230	Dec 12	05:46:07	6329	15224	T+	p-	0.1903	2.5021	1.5152	325.3	210.5	90.9
35	-12	3248	Dec 22	14:22:04	6493	15447	T+	p-	0.1778	2.5271	1.5362	326.7	211.4	92.0
36	-11	3267	Jan 02	23:00:47	6658	15670	T+	p-	0.1681	2.5467	1.5522	328.0	212.1	92.9
37	-10	3285	Jan 13	07:43:11	6825	15893	T+	p-	0.1619	2.5596	1.5620	329.2	212.6	93.4
38	-09	3303	Jan 25	16:25:48	6995	16116	T+	p-	0.1564	2.5711	1.5708	330.3	213.2	93.9
39	-08	3321	Feb 05	01:08:10	7166	16339	T+	p-	0.1514	2.5814	1.5789	331.4	213.9	94.4
40	-07	3339	Feb 16	09:48:24	7340	16562	T+	p-	0.1450	2.5939	1.5898	332.6	214.5	95.0
41	-06	3357	Feb 26	18:25:36	7516	16785	T+	pp	0.1368	2.6097	1.6042	333.7	215.3	95.8
42	-05	3375	Mar 10	02:57:11	7693	17008	T+	pp	0.1243	2.6330	1.6267	334.9	216.2	96.8
43	-04	3393	Mar 20	11:22:40	7873	17231	T+	pp	0.1073	2.6647	1.6577	336.2	217.2	97.9
44	-03	3411	Apr 01	19:40:38	8055	17454	T+	pp	0.0847	2.7062	1.6989	337.5	218.2	99.2
45	-02	3429	Apr 12	03:51:13	8239	17677	T+	pp	0.0567	2.7577	1.7502	338.7	219.3	100.4

46	-01	3447	Apr 23	11:51:33	8425	17900	T+	pp	0.0209	2.8235	1.8158	340.0	220.3	101.4
47	00	3465	May 03	19:44:01	8613	18123	T-	pp	-0.0208	2.8237	1.8159	341.0	220.9	101.7
48	01	3483	May 15	03:26:19	8804	18346	T-	pp	-0.0704	2.7329	1.7247	341.8	221.1	100.9
49	02	3501	May 26	11:01:15	8996	18569	T-	pp	-0.1252	2.6326	1.6239	342.2	220.6	98.6
50	03	3519	Jun 06	18:25:47	9190	18792	T-	-p	-0.1877	2.5183	1.5087	342.0	219.2	94.0
51	04	3537	Jun 17	01:44:13	9387	19015	T-	-p	-0.2546	2.3962	1.3854	341.2	216.5	86.2
52	05	3555	Jun 28	08:54:34	9585	19238	T	-a	-0.3276	2.2632	1.2508	339.4	212.3	73.2
53	06	3573	Jul 08	15:59:54	9786	19461	T	-a	-0.4037	2.1244	1.1100	336.7	206.3	50.9
54	07	3591	Jul 19	22:59:41	9988	19684	P	-h	-0.4836	1.9791	0.9621	332.8	198.1	-
55	08	3609	Jul 30	05:57:09	10193	19907	P	-h	-0.5646	1.8321	0.8121	327.7	187.6	-
56	09	3627	Aug 10	12:52:24	10400	20130	P	-h	-0.6465	1.6835	0.6600	321.4	174.0	-
57	10	3645	Aug 20	19:46:38	10608	20353	P	-t	-0.7283	1.5354	0.5080	313.8	157.0	-
58	11	3663	Sep 01	02:41:46	10819	20576	P	-t	-0.8084	1.3907	0.3589	305.1	135.4	-
59	12	3681	Sep 11	09:38:37	11032	20799	P	-t	-0.8861	1.2505	0.2139	295.2	107.1	-
60	13	3699	Sep 22	16:39:13	11247	21022	P	-t	-0.9596	1.1182	0.0765	284.4	65.5	-
61	14	3717	Oct 03	23:43:08	11465	21245	N	-t	-1.0294	0.9927	-0.0544	272.7	-	-
62	15	3735	Oct 15	06:53:38	11684	21468	N	-t	-1.0930	0.8789	-0.1737	260.7	-	-
63	16	3753	Oct 25	14:09:25	11905	21691	N	-t	-1.1513	0.7748	-0.2836	248.3	-	-
64	17	3771	Nov 05	21:32:22	12128	21914	N	-t	-1.2027	0.6833	-0.3807	236.3	-	-
65	18	3789	Nov 16	05:01:53	12354	22137	N	-t	-1.2481	0.6029	-0.4666	224.5	-	-
66	19	3807	Nov 28	12:39:23	12581	22360	N	-t	-1.2858	0.5363	-0.5385	213.8	-	-
67	20	3825	Dec 08	20:23:19	12811	22583	N	-t	-1.3181	0.4796	-0.6002	204.0	-	-
68	21	3843	Dec 20	04:13:18	13043	22806	N	-t	-1.3449	0.4328	-0.6516	195.2	-	-
69	22	3861	Dec 30	12:09:00	13276	23029	N	-t	-1.3663	0.3955	-0.6930	187.8	-	-
70	23	3880	Jan 10	20:09:56	13512	23252	N	-t	-1.3828	0.3670	-0.7250	181.8	-	-
71	24	3898	Jan 21	04:13:14	13750	23475	N	-t	-1.3971	0.3421	-0.7525	176.3	-	-
72	25	3916	Feb 02	12:18:51	13990	23698	N	-t	-1.4090	0.3213	-0.7755	171.5	-	-
73	26	3934	Feb 12	20:23:51	14232	23921	N	-t	-1.4211	0.2997	-0.7983	166.3	-	-

74	27	3952	Feb 24	04:28:32	14476	24144	N	-t	-1.4330	0.2783	-0.8204	160.7	-	-
75	28	3970	Mar 06	12:28:05	14722	24367	N	-t	-1.4483	0.2502	-0.8484	153.0	-	-
76	29	3988	Mar 16	20:24:50	14970	24590	N	-t	-1.4654	0.2184	-0.8794	143.4	-	-
77	30	4006	Mar 28	04:13:50	15220	24813	N	-t	-1.4882	0.1759	-0.9206	129.3	-	-
78	31	4024	Apr 07	11:57:11	15473	25036	N	-t	-1.5150	0.1257	-0.9689	109.8	-	-
79	32	4042	Apr 18	19:30:29	15727	25259	N	-t	-1.5495	0.0614	-1.0310	77.2	-	-

SAROS SERIES

175

Saros series 175 contains 74 lunar eclipses.

													PHASE
													DURATIONS
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-36	2791 Feb 11	02:59:35	2989	9784	N a-	-1.5670	0.0006	-1.0350	7.4	-	-	
02	-35	2809 Feb 21	11:23:26	3101	10007	N h-	-1.5610	0.0123	-1.0247	32.3	-	-	
03	-34	2827 Mar 04	19:41:32	3216	10230	N h-	-1.5510	0.0311	-1.0069	51.4	-	-	

04	-33	2845	Mar 15	03:52:11	3333	10453	N	h-	-1.5358	0.0593	-0.9793	70.9	-	-
05	-32	2863	Mar 26	11:55:16	3452	10676	N	h-	-1.5153	0.0972	-0.9418	90.8	-	-
06	-31	2881	Apr 05	19:48:04	3573	10899	N	t-	-1.4873	0.1486	-0.8905	112.1	-	-
07	-30	2899	Apr 17	03:32:15	3696	11122	N	t-	-1.4532	0.2113	-0.8279	133.3	-	-
08	-29	2917	Apr 28	11:05:50	3821	11345	N	t-	-1.4114	0.2878	-0.7514	155.0	-	-
09	-28	2935	May 09	18:31:22	3948	11568	N	t-	-1.3637	0.3755	-0.6640	176.2	-	-
10	-27	2953	May 20	01:45:10	4078	11791	N	t-	-1.3075	0.4788	-0.5610	197.6	-	-
11	-26	2971	May 31	08:52:28	4209	12014	N	t-	-1.2467	0.5908	-0.4496	217.8	-	-
12	-25	2989	Jun 10	15:50:11	4342	12237	N	t-	-1.1789	0.7155	-0.3258	237.6	-	-
13	-24	3007	Jun 22	22:43:09	4478	12460	N	t-	-1.1076	0.8471	-0.1955	255.9	-	-
14	-23	3025	Jul 03	05:28:23	4616	12683	N	t-	-1.0305	0.9894	-0.0548	273.4	-	-
15	-22	3043	Jul 14	12:11:50	4755	12906	P	t-	-0.9522	1.1340	0.0877	289.1	70.7	-
16	-21	3061	Jul 24	18:51:12	4897	13129	P	t-	-0.8714	1.2836	0.2348	303.6	113.6	-
17	-20	3079	Aug 05	01:30:03	5041	13352	P	t-	-0.7903	1.4338	0.3821	316.4	142.2	-
18	-19	3097	Aug 15	08:08:00	5187	13575	P	t-	-0.7088	1.5852	0.5301	327.9	164.0	-
19	-18	3115	Aug 27	14:48:55	5334	13798	P	t-	-0.6300	1.7315	0.6728	337.7	180.9	-
20	-17	3133	Sep 06	21:32:27	5484	14021	P	t-	-0.5537	1.8735	0.8108	346.2	194.3	-
21	-16	3151	Sep 18	04:20:11	5637	14244	P	t-	-0.4813	2.0087	0.9417	353.2	204.9	-
22	-15	3169	Sep 28	11:13:37	5791	14467	T	t-	-0.4139	2.1345	1.0631	359.1	213.1	40.6
23	-14	3187	Oct 09	18:13:50	5947	14690	T	t-	-0.3524	2.2496	1.1737	363.8	219.3	65.1
24	-13	3205	Oct 20	01:21:06	6105	14913	T	p-	-0.2969	2.3538	1.2733	367.6	224.0	78.8
25	-12	3223	Oct 31	08:35:54	6266	15136	T-	pp	-0.2479	2.4460	1.3610	370.6	227.5	87.6
26	-11	3241	Nov 10	15:59:00	6428	15359	T-	pp	-0.2059	2.5252	1.4360	373.0	229.9	93.4
27	-10	3259	Nov 21	23:30:22	6592	15582	T-	pp	-0.1708	2.5915	1.4983	374.8	231.6	97.2
28	-09	3277	Dec 02	07:08:11	6759	15805	T-	pp	-0.1412	2.6476	1.5508	376.2	232.8	99.7
29	-08	3295	Dec 13	14:54:03	6928	16028	T-	pp	-0.1182	2.6915	1.5916	377.2	233.6	101.3
30	-07	3313	Dec 24	22:45:35	7098	16251	T-	pp	-0.0996	2.7269	1.6245	378.0	234.1	102.4
31	-06	3332	Jan 05	06:42:42	7271	16474	T-	pp	-0.0856	2.7534	1.6493	378.5	234.4	103.0

32	-05	3350	Jan 15	14:41:33	7446	16697	T-	pp	-0.0730	2.7771	1.6718	378.9	234.7	103.5
33	-04	3368	Jan 26	22:43:39	7623	16920	T-	pp	-0.0629	2.7959	1.6903	379.0	234.8	103.9
34	-03	3386	Feb 06	06:45:10	7802	17143	T-	pp	-0.0519	2.8158	1.7106	379.0	235.0	104.3
35	-02	3404	Feb 18	14:45:15	7983	17366	T-	pp	-0.0397	2.8375	1.7335	378.9	235.1	104.6
36	-01	3422	Feb 28	22:41:37	8166	17589	T-	pp	-0.0244	2.8648	1.7626	378.6	235.2	104.9
37	00	3440	Mar 11	06:33:59	8352	17812	T-	pp	-0.0057	2.8978	1.7983	378.1	235.2	105.1
38	01	3458	Mar 22	14:20:15	8539	18035	T+	pp	0.0183	2.8731	1.7767	377.5	235.1	105.1
39	02	3476	Apr 01	21:59:11	8728	18258	T+	pp	0.0484	2.8158	1.7231	376.5	234.7	104.7
40	03	3494	Apr 13	05:31:05	8920	18481	T+	pp	0.0846	2.7474	1.6587	375.3	234.1	103.5
41	04	3512	Apr 24	12:55:07	9113	18704	T+	pp	0.1273	2.6669	1.5826	373.7	232.8	101.1
42	05	3530	May 05	20:10:40	9309	18927	T+	pp	0.1773	2.5729	1.4932	371.5	230.8	96.9
43	06	3548	May 16	03:18:50	9506	19150	T+	pp	0.2335	2.4674	1.3922	368.7	227.8	90.1
44	07	3566	May 27	10:19:49	9706	19373	T	pp	0.2960	2.3505	1.2799	365.0	223.5	79.4
45	08	3584	Jun 06	17:15:13	9908	19596	T	-t	0.3636	2.2242	1.1581	360.5	217.7	62.2
46	09	3602	Jun 18	00:03:38	10112	19819	T	-t	0.4372	2.0869	1.0251	354.7	209.8	25.8
47	10	3620	Jun 28	06:49:25	10318	20042	P	-t	0.5134	1.9451	0.8874	347.8	199.9	-
48	11	3638	Jul 09	13:31:14	10526	20265	P	-t	0.5930	1.7971	0.7430	339.6	187.2	-
49	12	3656	Jul 19	20:12:42	10736	20488	P	-t	0.6736	1.6475	0.5969	330.2	171.6	-
50	13	3674	Jul 31	02:52:39	10948	20711	P	-t	0.7557	1.4953	0.4476	319.3	151.8	-
51	14	3692	Aug 10	09:35:42	11162	20934	P	-t	0.8359	1.3469	0.3018	307.2	127.1	-
52	15	3710	Aug 22	16:20:40	11379	21157	P	-t	0.9145	1.2016	0.1585	294.0	93.8	-
53	16	3728	Sep 01	23:09:37	11597	21380	P	-t	0.9905	1.0613	0.0201	279.6	33.9	-
54	17	3746	Sep 13	06:03:45	11817	21603	N	-t	1.0626	0.9282	-0.1118	264.3	-	-
55	18	3764	Sep 23	13:04:50	12040	21826	N	-t	1.1296	0.8048	-0.2342	248.5	-	-
56	19	3782	Oct 04	20:13:51	12265	22049	N	-t	1.1906	0.6925	-0.3458	232.4	-	-
57	20	3800	Oct 16	03:30:11	12491	22272	N	-t	1.2463	0.5902	-0.4477	216.0	-	-
58	21	3818	Oct 27	10:56:47	12720	22495	N	-t	1.2943	0.5020	-0.5356	200.3	-	-
59	22	3836	Nov 06	18:31:54	12951	22718	N	-t	1.3362	0.4250	-0.6125	185.1	-	-

60	23	3854	Nov 18	02:17:16	13184	22941	N	-t	1.3707	0.3616	-0.6758	171.2	-	-
61	24	3872	Nov 28	10:10:39	13419	23164	N	-h	1.3995	0.3087	-0.7285	158.5	-	-
62	25	3890	Dec 09	18:14:23	13656	23387	N	-h	1.4210	0.2691	-0.7677	148.0	-	-
63	26	3908	Dec 21	02:25:11	13895	23610	N	-h	1.4376	0.2383	-0.7978	139.3	-	-
64	27	3927	Jan 01	10:43:32	14136	23833	N	-h	1.4491	0.2166	-0.8185	132.6	-	-
65	28	3945	Jan 11	19:07:22	14379	24056	N	-a	1.4571	0.2012	-0.8325	127.6	-	-
66	29	3963	Jan 23	03:36:49	14625	24279	N	-a	1.4616	0.1921	-0.8398	124.4	-	-
67	30	3981	Feb 02	12:08:07	14872	24502	N	-a	1.4651	0.1844	-0.8450	121.5	-	-
68	31	3999	Feb 13	20:41:02	15121	24725	N	-a	1.4680	0.1775	-0.8489	118.9	-	-
69	32	4017	Feb 24	05:13:22	15373	24948	N	-a	1.4721	0.1683	-0.8547	115.5	-	-
70	33	4035	Mar 07	13:45:07	15627	25171	N	-a	1.4776	0.1563	-0.8627	111.0	-	-
71	34	4053	Mar 17	22:12:01	15882	25394	N	-a	1.4873	0.1362	-0.8782	103.4	-	-
72	35	4071	Mar 29	06:35:59	16140	25617	N	-a	1.4998	0.1107	-0.8989	93.1	-	-
73	36	4089	Apr 08	14:53:28	16400	25840	N	-a	1.5180	0.0747	-0.9298	76.4	-	-
74	37	4107	Apr 20	23:06:44	16662	26063	N	-a	1.5403	0.0311	-0.9679	49.3	-	-

SAROS SERIES

176

Saros series 176 contains 79 lunar eclipses.

													PHASE
													DURATIONS
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m
GREATEST													
ECLIPSE													
01	-33	2747 Dec 09	01:24:50	2727	9250	N t-	1.5632	0.0390	-1.0588	61.5	-	-	
02	-32	2765 Dec 19	09:20:56	2835	9473	N t-	1.5466	0.0698	-1.0288	82.1	-	-	
03	-31	2783 Dec 30	17:20:31	2945	9696	N t-	1.5323	0.0959	-1.0027	95.9	-	-	
04	-30	2802 Jan 10	01:25:15	3057	9919	N t-	1.5217	0.1152	-0.9828	104.7	-	-	
05	-29	2820 Jan 21	09:30:50	3171	10142	N t-	1.5117	0.1328	-0.9639	112.1	-	-	
06	-28	2838 Jan 31	17:37:23	3287	10365	N t-	1.5016	0.1502	-0.9442	118.8	-	-	
07	-27	2856 Feb 12	01:40:49	3405	10588	N t-	1.4886	0.1726	-0.9190	126.8	-	-	
08	-26	2874 Feb 22	09:42:48	3525	10811	N t-	1.4739	0.1979	-0.8901	135.1	-	-	
09	-25	2892 Mar 04	17:39:19	3647	11034	N t-	1.4542	0.2318	-0.8520	145.3	-	-	
10	-24	2910 Mar 17	01:30:26	3772	11257	N t-	1.4298	0.2742	-0.8049	157.0	-	-	
11	-23	2928 Mar 27	09:14:32	3898	11480	N t-	1.3992	0.3278	-0.7462	170.2	-	-	
12	-22	2946 Apr 07	16:52:13	4026	11703	N t-	1.3626	0.3922	-0.6763	184.4	-	-	
13	-21	2964 Apr 18	00:21:54	4157	11926	N t-	1.3188	0.4696	-0.5932	199.6	-	-	
14	-20	2982 Apr 29	07:44:37	4290	12149	N t-	1.2686	0.5588	-0.4982	215.1	-	-	
15	-19	3000 May 10	15:00:16	4424	12372	N t-	1.2117	0.6604	-0.3907	230.6	-	-	
16	-18	3018 May 21	22:10:31	4561	12595	N t-	1.1493	0.7719	-0.2736	245.5	-	-	
17	-17	3036 Jun 01	05:13:45	4700	12818	N t-	1.0801	0.8962	-0.1438	260.1	-	-	
18	-16	3054 Jun 12	12:14:13	4841	13041	Nx t-	1.0074	1.0269	-0.0079	273.5	-	-	
19	-15	3072 Jun 22	19:10:11	4984	13264	P t-	0.9297	1.1671	0.1373	285.9	86.3	-	
20	-14	3090 Jul 04	02:06:14	5129	13487	P t-	0.8509	1.3095	0.2841	296.8	121.2	-	
21	-13	3108 Jul 15	08:59:25	5276	13710	P h-	0.7684	1.4588	0.4374	306.7	146.5	-	

22	-12	3126	Jul 26	15:55:45	5425	13933	P	h-	0.6872	1.6059	0.5881	314.8	165.4	-
23	-11	3144	Aug 05	22:52:13	5576	14156	P	h-	0.6048	1.7556	0.7408	321.8	180.4	-
24	-10	3162	Aug 17	05:53:32	5730	14379	P	h-	0.5255	1.8998	0.8876	327.3	191.9	-
25	-09	3180	Aug 27	12:57:54	5885	14602	T	a-	0.4477	2.0415	1.0314	331.7	200.9	27.7
26	-08	3198	Sep 07	20:09:58	6042	14825	T	a-	0.3753	2.1736	1.1651	334.8	207.4	60.8
27	-07	3216	Sep 18	03:27:52	6202	15048	T	a-	0.3067	2.2989	1.2916	336.9	212.2	77.2
28	-06	3234	Sep 29	10:53:52	6364	15271	T+	p-	0.2439	2.4136	1.4072	338.2	215.4	87.2
29	-05	3252	Oct 09	18:27:56	6527	15494	T+	p-	0.1871	2.5176	1.5117	338.8	217.5	93.4
30	-04	3270	Oct 21	02:11:21	6693	15717	T+	p-	0.1375	2.6084	1.6028	338.8	218.6	97.2
31	-03	3288	Oct 31	10:03:42	6861	15940	T+	p-	0.0944	2.6875	1.6821	338.5	219.0	99.3
32	-02	3306	Nov 12	18:04:45	7031	16163	T+	pp	0.0578	2.7545	1.7492	337.8	218.9	100.3
33	-01	3324	Nov 23	02:15:05	7203	16386	T+	pp	0.0281	2.8090	1.8038	337.0	218.6	100.6
34	00	3342	Dec 04	10:33:36	7377	16609	T+	pp	0.0047	2.8518	1.8470	336.1	218.0	100.5
35	01	3360	Dec 14	18:59:27	7553	16832	T-	pp	-0.0133	2.8358	1.8315	335.1	217.5	100.3
36	02	3378	Dec 26	03:31:55	7731	17055	T-	pp	-0.0262	2.8116	1.8082	334.1	216.9	99.9
37	03	3397	Jan 05	12:09:22	7911	17278	T-	pp	-0.0357	2.7936	1.7914	333.1	216.3	99.6
38	04	3415	Jan 17	20:50:42	8094	17501	T-	pp	-0.0423	2.7806	1.7800	332.1	215.8	99.3
39	05	3433	Jan 28	05:33:07	8278	17724	T-	pp	-0.0486	2.7680	1.7695	331.1	215.3	99.0
40	06	3451	Feb 08	14:17:04	8465	17947	T-	pp	-0.0539	2.7569	1.7611	330.0	214.8	98.8
41	07	3469	Feb 18	22:59:34	8653	18170	T-	pp	-0.0606	2.7432	1.7504	329.0	214.3	98.6
42	08	3487	Mar 02	07:39:42	8844	18393	T-	pp	-0.0698	2.7245	1.7353	327.8	213.9	98.2
43	09	3505	Mar 13	16:15:19	9037	18616	T-	pp	-0.0831	2.6981	1.7126	326.7	213.4	97.7
44	10	3523	Mar 25	00:46:37	9231	18839	T-	pp	-0.1004	2.6643	1.6830	325.4	212.7	97.0
45	11	3541	Apr 04	09:12:15	9428	19062	T-	p	-0.1228	2.6209	1.6440	324.0	212.0	95.9
46	12	3559	Apr 15	17:30:48	9627	19285	T-	p	-0.1515	2.5660	1.5936	322.5	210.9	94.1
47	13	3577	Apr 26	01:43:13	9828	19508	T-	p	-0.1858	2.5008	1.5329	320.7	209.5	91.5
48	14	3595	May 07	09:48:30	10031	19731	T-	p	-0.2268	2.4234	1.4599	318.6	207.5	87.5
49	15	3613	May 17	17:47:37	10236	19954	T	p	-0.2733	2.3360	1.3766	316.1	204.9	81.6

50	16	3631	May 29	01:39:22	10443	20177	T	-p	-0.3264	2.2366	1.2812	313.2	201.4	72.9	
51	17	3649	Jun 08	09:26:16	10653	20400	T	-p	-0.3840	2.1290	1.1772	309.6	196.8	59.8	
52	18	3667	Jun 19	17:07:54	10864	20623	T	-a	-0.4465	2.0127	1.0640	305.3	191.0	37.2	
53	19	3685	Jun 30	00:44:59	11078	20846	P	-a	-0.5132	1.8890	0.9430	300.3	183.6	-	
54	20	3703	Jul 12	08:19:07	11293	21069	P	-a	-0.5826	1.7607	0.8167	294.4	174.6	-	
55	21	3721	Jul 22	15:50:55	11511	21292	P	-a	-0.6542	1.6286	0.6860	287.5	163.4	-	
56	22	3739	Aug 02	23:22:25	11730	21515	P	-a	-0.7260	1.4963	0.5546	279.9	149.9	-	
57	23	3757	Aug 13	06:52:40	11952	21738	P	-a	-0.7990	1.3623	0.4208	271.2	133.2	-	
58	24	3775	Aug 24	14:25:10	12176	21961	P	-a	-0.8701	1.2319	0.2901	261.7	112.7	-	
59	25	3793	Sep 03	21:59:16	12402	22184	P	-a	-0.9401	1.1041	0.1613	251.4	85.6	-	
60	26	3811	Sep 16	05:37:11	12630	22407	P	-a	-1.0067	0.9827	0.0384	240.4	42.5	-	
61	27	3829	Sep 26	13:18:54	12859	22630	N	-a	-1.0701	0.8674	-0.0790	228.8	-	-	
62	28	3847	Oct 07	21:06:44	13092	22853	N	-a	-1.1284	0.7616	-0.1873	216.9	-	-	
63	29	3865	Oct 18	05:00:38	13326	23076	N	-a	-1.1817	0.6653	-0.2866	204.9	-	-	
64	30	3883	Oct 29	13:00:31	13562	23299	N	-a	-1.2302	0.5779	-0.3772	192.9	-	-	
65	31	3901	Nov 09	21:07:55	13800	23522	N	-a	-1.2725	0.5021	-0.4564	181.4	-	-	
66	32	3919	Nov 21	05:22:03	14041	23745	N	-a	-1.3090	0.4369	-0.5252	170.6	-	-	
67	33	3937	Dec 01	13:44:03	14283	23968	N	-a	-1.3394	0.3830	-0.5827	160.8	-	-	
68	34	3955	Dec 12	22:11:08	14527	24191	N	-a	-1.3655	0.3369	-0.6324	151.7	-	-	
69	35	3973	Dec 23	06:45:44	14774	24414	N	-a	-1.3854	0.3020	-0.6707	144.4	-	-	
70	36	3992	Jan 03	15:24:23	15023	24637	N	-a	-1.4019	0.2733	-0.7025	138.0	-	-	
71	37	4010	Jan 14	00:08:07	15273	24860	N	-a	-1.4141	0.2523	-0.7263	133.1	-	-	
72	38	4028	Jan 25	08:53:30	15526	25083	N	-a	-1.4249	0.2338	-0.7472	128.7	-	-	
73	39	4046	Feb 04	17:41:23	15781	25306	N	-a	-1.4335	0.2190	-0.7640	124.9	-	-	
74	40	4064	Feb 16	02:28:14	16038	25529	N	-a	-1.4427	0.2030	-0.7817	120.7	-	-	
75	41	4082	Feb 26	11:13:50	16297	25752	N	-a	-1.4527	0.1853	-0.8006	115.7	-	-	
76	42	4100	Mar 09	19:56:03	16558	25975	N	-a	-1.4651	0.1628	-0.8238	108.9	-	-	
77	43	4118	Mar 21	04:34:51	16821	26198	N	-a	-1.4800	0.1356	-0.8514	99.9	-	-	

78	44	4136	Mar 31	13:06:55	17087	26421	N	-a	-1.5003	0.0985	-0.8887	85.6	-	-
79	45	4154	Apr 11	21:33:08	17354	26644	N	-a	-1.5251	0.0530	-0.9341	63.2	-	-

SAROS SERIES

177

Saros series 177 contains 73 lunar eclipses.

													PHASE	
													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-38	2704 Oct 05	11:58:46	2478	8716	Nb a-	-1.5219	0.0542	-0.9236	63.8	-	-		
02	-37	2722 Oct 16	19:56:04	2580	8939	N a-	-1.4756	0.1393	-0.8388	101.4	-	-		
03	-36	2740 Oct 27	04:01:09	2685	9162	N a-	-1.4349	0.2142	-0.7644	124.5	-	-		
04	-35	2758 Nov 07	12:15:27	2792	9385	N a-	-1.4012	0.2763	-0.7029	140.3	-	-		
05	-34	2776 Nov 17	20:37:54	2901	9608	N a-	-1.3735	0.3274	-0.6523	151.7	-	-		
06	-33	2794 Nov 29	05:08:06	3012	9831	N a-	-1.3518	0.3675	-0.6126	159.8	-	-		
07	-32	2812 Dec 09	13:44:30	3125	10054	N a-	-1.3347	0.3989	-0.5815	165.7	-	-		

08	-31	2830	Dec 20	22:26:34	3241	10277	N	a-	-1.3219	0.4223	-0.5579	169.8	-	-
09	-30	2848	Dec 31	07:13:15	3358	10500	N	a-	-1.3127	0.4391	-0.5407	172.6	-	-
10	-29	2867	Jan 11	16:01:40	3477	10723	N	a-	-1.3045	0.4537	-0.5252	174.9	-	-
11	-28	2885	Jan 22	00:52:23	3599	10946	N	a-	-1.2981	0.4648	-0.5128	176.6	-	-
12	-27	2903	Feb 03	09:41:43	3722	11169	N	a-	-1.2903	0.4781	-0.4977	178.6	-	-
13	-26	2921	Feb 13	18:30:10	3848	11392	N	a-	-1.2821	0.4921	-0.4816	180.7	-	-
14	-25	2939	Feb 25	03:13:32	3975	11615	N	a-	-1.2696	0.5137	-0.4575	183.9	-	-
15	-24	2957	Mar 07	11:54:01	4105	11838	N	a-	-1.2550	0.5392	-0.4292	187.7	-	-
16	-23	2975	Mar 18	20:27:49	4237	12061	N	a-	-1.2347	0.5749	-0.3904	192.9	-	-
17	-22	2993	Mar 29	04:55:44	4371	12284	N	a-	-1.2097	0.6191	-0.3431	199.0	-	-
18	-21	3011	Apr 10	13:15:44	4507	12507	N	a-	-1.1785	0.6747	-0.2842	206.4	-	-
19	-20	3029	Apr 20	21:29:36	4645	12730	N	a-	-1.1423	0.7396	-0.2162	214.4	-	-
20	-19	3047	May 02	05:35:38	4785	12953	N	a-	-1.0996	0.8165	-0.1364	223.3	-	-
21	-18	3065	May 12	13:34:24	4927	13176	N	a-	-1.0509	0.9045	-0.0456	232.8	-	-
22	-17	3083	May 23	21:26:36	5071	13399	P	a-	-0.9967	1.0026	0.0549	242.4	50.6	-
23	-16	3101	Jun 04	05:13:08	5218	13622	P	a-	-0.9381	1.1092	0.1634	252.0	86.1	-
24	-15	3119	Jun 15	12:53:40	5366	13845	P	a-	-0.8745	1.2252	0.2808	261.5	111.1	-
25	-14	3137	Jun 25	20:30:09	5516	14068	P	a-	-0.8075	1.3478	0.4044	270.5	131.0	-
26	-13	3155	Jul 07	04:02:50	5669	14291	P	a-	-0.7375	1.4760	0.5329	279.0	147.6	-
27	-12	3173	Jul 17	11:34:10	5823	14514	P	a-	-0.6666	1.6062	0.6628	286.8	161.4	-
28	-11	3191	Jul 28	19:02:11	5980	14737	P	a-	-0.5932	1.7414	0.7971	293.9	173.3	-
29	-10	3209	Aug 08	02:31:46	6139	14960	P	a-	-0.5214	1.8739	0.9281	300.2	183.0	-
30	-09	3227	Aug 19	10:00:55	6300	15183	T	a-	-0.4497	2.0066	1.0586	305.7	191.1	35.7
31	-08	3245	Aug 29	17:33:52	6462	15406	T	p-	-0.3813	2.1333	1.1826	310.4	197.6	60.8
32	-07	3263	Sep 10	01:08:06	6627	15629	T	p-	-0.3146	2.2575	1.3035	314.4	202.8	75.4
33	-06	3281	Sep 20	08:48:45	6794	15852	T-	p-	-0.2537	2.3712	1.4135	317.7	206.7	84.7
34	-05	3299	Oct 01	16:33:12	6964	16075	T-	p-	-0.1964	2.4784	1.5165	320.4	209.6	91.0
35	-04	3317	Oct 13	00:24:15	7135	16298	T-	pp	-0.1449	2.5751	1.6087	322.6	211.7	95.1

36	-03	3335	Oct 24	08:20:48	7308	16521	T-	pp	-0.0984	2.6628	1.6916	324.5	213.1	97.6
37	-02	3353	Nov 03	16:25:26	7483	16744	T-	pp	-0.0589	2.7378	1.7617	326.1	214.1	99.0
38	-01	3371	Nov 15	00:36:18	7661	16967	T-	pp	-0.0253	2.8019	1.8208	327.5	214.7	99.6
39	00	3389	Nov 25	08:53:37	7840	17190	T+	pp	0.0026	2.8460	1.8601	328.7	215.1	99.8
40	01	3407	Dec 07	17:17:33	8022	17413	T+	pp	0.0245	2.8083	1.8175	329.9	215.3	99.6
41	02	3425	Dec 18	01:47:27	8205	17636	T+	pp	0.0415	2.7794	1.7843	331.0	215.6	99.4
42	03	3443	Dec 29	10:21:37	8391	17859	T+	-p	0.0541	2.7584	1.7591	332.2	215.8	99.2
43	04	3462	Jan 08	18:58:51	8579	18082	T+	-p	0.0638	2.7425	1.7394	333.3	216.1	99.0
44	05	3480	Jan 20	03:38:21	8768	18305	T+	-p	0.0709	2.7310	1.7246	334.4	216.5	98.8
45	06	3498	Jan 30	12:18:42	8960	18528	T+	-p	0.0771	2.7211	1.7119	335.4	216.8	98.8
46	07	3516	Feb 11	20:57:17	9154	18751	T+	-p	0.0842	2.7093	1.6979	336.5	217.2	98.6
47	08	3534	Feb 22	05:34:07	9350	18974	T+	-p	0.0923	2.6953	1.6820	337.4	217.6	98.5
48	09	3552	Mar 04	14:06:26	9548	19197	T+	-p	0.1035	2.6755	1.6608	338.4	217.9	98.2
49	10	3570	Mar 15	22:33:47	9749	19420	T+	-p	0.1183	2.6488	1.6332	339.2	218.1	97.6
50	11	3588	Mar 26	06:53:37	9951	19643	T+	-p	0.1388	2.6114	1.5952	339.9	218.1	96.5
51	12	3606	Apr 06	15:06:51	10155	19866	T+	-p	0.1643	2.5649	1.5483	340.4	217.9	94.9
52	13	3624	Apr 16	23:11:27	10361	20089	T+	-p	0.1964	2.5061	1.4892	340.6	217.3	92.2
53	14	3642	Apr 28	07:06:51	10570	20312	T+	-p	0.2354	2.4346	1.4175	340.4	216.1	87.9
54	15	3660	May 08	14:53:14	10780	20535	T	-p	0.2811	2.3510	1.3336	339.9	214.1	81.3
55	16	3678	May 19	22:30:27	10993	20758	T	-a	0.3335	2.2550	1.2372	338.6	211.0	71.2
56	17	3696	May 30	05:59:22	11208	20981	T	-a	0.3922	2.1477	1.1292	336.7	206.6	54.6
57	18	3714	Jun 11	13:18:34	11424	21204	T	-a	0.4579	2.0275	1.0083	333.7	200.4	14.4
58	19	3732	Jun 21	20:31:23	11643	21427	P	-h	0.5278	1.8998	0.8793	329.7	192.2	-
59	20	3750	Jul 03	03:36:38	11864	21650	P	-h	0.6027	1.7632	0.7411	324.5	181.3	-
60	21	3768	Jul 13	10:36:47	12087	21873	P	-t	0.6808	1.6210	0.5968	317.8	167.2	-
61	22	3786	Jul 24	17:31:40	12312	22096	P	-t	0.7623	1.4728	0.4460	309.5	148.5	-
62	23	3804	Aug 05	00:24:18	12539	22319	P	-t	0.8443	1.3237	0.2940	299.7	123.7	-
63	24	3822	Aug 16	07:14:53	12769	22542	P	-t	0.9268	1.1740	0.1409	288.1	87.8	-

SAROS SERIES

178

ECLIPSE

01	-35	2769	Oct 07	18:39:36	2858	9520	N	a-	1.5105	0.0826	-0.9101	80.0	-	-
02	-34	2787	Oct 19	02:29:28	2968	9743	N	a-	1.4715	0.1571	-0.8415	110.1	-	-
03	-33	2805	Oct 29	10:25:36	3081	9966	N	a-	1.4380	0.2215	-0.7830	130.5	-	-
04	-32	2823	Nov 09	18:28:33	3195	10189	N	a-	1.4106	0.2749	-0.7355	145.3	-	-
05	-31	2841	Nov 20	02:38:13	3311	10412	N	a-	1.3890	0.3173	-0.6988	156.1	-	-
06	-30	2859	Dec 01	10:54:30	3430	10635	N	a-	1.3737	0.3481	-0.6734	163.8	-	-
07	-29	2877	Dec 11	19:15:31	3551	10858	N	a-	1.3625	0.3712	-0.6554	169.4	-	-
08	-28	2895	Dec 23	03:40:24	3673	11081	N	a-	1.3551	0.3871	-0.6441	173.4	-	-
09	-27	2914	Jan 03	12:08:10	3798	11304	N	a-	1.3509	0.3969	-0.6384	176.1	-	-
10	-26	2932	Jan 14	20:38:00	3925	11527	N	a-	1.3492	0.4018	-0.6371	177.8	-	-
11	-25	2950	Jan 25	05:06:25	4054	11750	N	h-	1.3472	0.4071	-0.6348	179.5	-	-
12	-24	2968	Feb 05	13:34:06	4185	11973	N	h-	1.3453	0.4118	-0.6325	181.0	-	-
13	-23	2986	Feb 15	21:57:16	4318	12196	N	h-	1.3404	0.4215	-0.6245	183.6	-	-
14	-22	3004	Feb 28	06:16:54	4453	12419	N	h-	1.3335	0.4349	-0.6124	186.9	-	-
15	-21	3022	Mar 10	14:28:10	4590	12642	N	h-	1.3208	0.4587	-0.5895	192.0	-	-
16	-20	3040	Mar 20	22:34:00	4729	12865	N	t-	1.3043	0.4891	-0.5594	198.3	-	-
17	-19	3058	Apr 01	06:29:43	4871	13088	N	t-	1.2804	0.5330	-0.5157	206.8	-	-
18	-18	3076	Apr 11	14:17:44	5014	13311	N	t-	1.2509	0.5872	-0.4615	216.5	-	-
19	-17	3094	Apr 22	21:54:30	5160	13534	N	t-	1.2128	0.6572	-0.3915	228.2	-	-
20	-16	3112	May 04	05:23:22	5307	13757	N	t-	1.1689	0.7376	-0.3109	240.5	-	-
21	-15	3130	May 15	12:41:35	5457	13980	N	t-	1.1170	0.8329	-0.2157	253.8	-	-
22	-14	3148	May 25	19:51:04	5608	14203	N	t-	1.0585	0.9401	-0.1085	267.5	-	-
23	-13	3166	Jun 06	02:51:41	5762	14426	P	t-	0.9933	1.0601	0.0110	281.3	25.3	-
24	-12	3184	Jun 16	09:45:27	5918	14649	P	t-	0.9228	1.1898	0.1401	294.7	88.8	-
25	-11	3202	Jun 27	16:32:36	6076	14872	P	t-	0.8474	1.3287	0.2779	307.5	122.9	-
26	-10	3220	Jul 07	23:14:15	6236	15095	P	t-	0.7680	1.4751	0.4229	319.5	148.6	-
27	-09	3238	Jul 19	05:52:12	6398	15318	P	t-	0.6859	1.6267	0.5727	330.4	169.3	-

28	-08	3256	Jul 29	12:28:11	6562	15541	P	t-	0.6023	1.7811	0.7249	340.2	186.1	-
29	-07	3274	Aug 09	19:02:22	6728	15764	P	t-	0.5177	1.9377	0.8790	348.8	199.9	-
30	-06	3292	Aug 20	01:38:07	6897	15987	T	t-	0.4345	2.0918	1.0300	356.0	210.8	28.3
31	-05	3310	Sep 01	08:15:34	7067	16210	T	t-	0.3531	2.2428	1.1778	362.0	219.3	65.8
32	-04	3328	Sep 11	14:58:10	7239	16433	T	pp	0.2760	2.3862	1.3176	366.7	225.6	83.7
33	-03	3346	Sep 22	21:43:53	7414	16656	T+	pp	0.2016	2.5246	1.4521	370.3	230.2	94.7
34	-02	3364	Oct 03	04:37:12	7590	16879	T+	pp	0.1336	2.6513	1.5748	373.0	233.1	101.1
35	-01	3382	Oct 14	11:36:15	7769	17102	T+	pp	0.0706	2.7690	1.6885	374.8	234.8	104.6
36	00	3400	Oct 25	18:44:12	7950	17325	T+	pp	0.0151	2.8730	1.7884	376.0	235.4	105.7
37	01	3418	Nov 06	01:58:59	8133	17548	T-	pp	-0.0347	2.8390	1.7504	376.7	235.3	105.4
38	02	3436	Nov 16	09:23:26	8317	17771	T-	pp	-0.0764	2.7643	1.6720	377.0	234.8	104.0
39	03	3454	Nov 27	16:55:19	8504	17994	T-	pp	-0.1118	2.7010	1.6053	377.0	234.0	102.0
40	04	3472	Dec 08	00:34:55	8693	18217	T-	pp	-0.1406	2.6497	1.5510	376.9	233.1	99.8
41	05	3490	Dec 19	08:21:24	8884	18440	T-	pp	-0.1638	2.6084	1.5072	376.7	232.1	97.6
42	06	3508	Dec 30	16:14:05	9077	18663	T-	pp	-0.1813	2.5772	1.4741	376.5	231.3	95.8
43	07	3527	Jan 11	00:11:19	9273	18886	T-	pp	-0.1955	2.5518	1.4475	376.2	230.6	94.1
44	08	3545	Jan 21	08:10:54	9470	19109	T-	pp	-0.2077	2.5297	1.4249	375.7	229.9	92.5
45	09	3563	Feb 01	16:12:54	9669	19332	T-	pp	-0.2179	2.5108	1.4063	375.2	229.3	91.1
46	10	3581	Feb 12	00:14:51	9871	19555	T-	pp	-0.2280	2.4918	1.3884	374.5	228.6	89.7
47	11	3599	Feb 23	08:14:46	10074	19778	T-	pp	-0.2401	2.4686	1.3670	373.6	227.8	88.0
48	12	3617	Mar 05	16:11:27	10280	20001	T-	-p	-0.2550	2.4400	1.3409	372.5	226.8	85.6
49	13	3635	Mar 17	00:03:42	10487	20224	T	-p	-0.2740	2.4036	1.3076	371.0	225.4	82.4
50	14	3653	Mar 27	07:50:36	10697	20447	T	-p	-0.2976	2.3585	1.2662	369.1	223.6	77.8
51	15	3671	Apr 07	15:29:56	10909	20670	T	-p	-0.3275	2.3015	1.2133	366.7	221.1	71.0
52	16	3689	Apr 17	23:02:50	11123	20893	T	-p	-0.3631	2.2339	1.1502	363.7	217.8	60.8
53	17	3707	Apr 30	06:27:46	11339	21116	T	-t	-0.4057	2.1534	1.0745	360.1	213.4	43.9
54	18	3725	May 10	13:45:00	11557	21339	P	-t	-0.4548	2.0607	0.9868	355.6	207.7	-
55	19	3743	May 21	20:54:29	11777	21562	P	-t	-0.5108	1.9555	0.8866	350.1	200.2	-

56	20	3761	Jun 01	03:57:37	11999	21785	P	-t	-0.5723	1.8401	0.7762	343.5	190.6	-
57	21	3779	Jun 12	10:55:06	12223	22008	P	-t	-0.6388	1.7156	0.6564	335.7	178.6	-
58	22	3797	Jun 22	17:46:33	12449	22231	P	-t	-0.7107	1.5813	0.5268	326.4	163.0	-
59	23	3815	Jul 05	00:35:16	12678	22454	P	-t	-0.7855	1.4420	0.3918	315.7	143.2	-
60	24	3833	Jul 15	07:20:45	12908	22677	P	-t	-0.8634	1.2970	0.2507	303.3	116.7	-
61	25	3851	Jul 26	14:06:25	13141	22900	P	-t	-0.9416	1.1517	0.1090	289.4	78.3	-
62	26	3869	Aug 05	20:50:37	13375	23123	Nx	-t	-1.0214	1.0036	-0.0359	273.5	-	-
63	27	3887	Aug 17	03:38:28	13612	23346	N	-t	-1.0991	0.8598	-0.1770	256.0	-	-
64	28	3905	Aug 28	10:28:24	13851	23569	N	-t	-1.1756	0.7182	-0.3162	236.5	-	-
65	29	3923	Sep 08	17:23:24	14091	23792	N	-t	-1.2485	0.5834	-0.4492	215.3	-	-
66	30	3941	Sep 19	00:23:25	14334	24015	N	-t	-1.3179	0.4554	-0.5757	191.9	-	-
67	31	3959	Sep 30	07:31:21	14579	24238	N	-t	-1.3814	0.3384	-0.6916	166.7	-	-
68	32	3977	Oct 10	14:46:54	14826	24461	N	-t	-1.4394	0.2314	-0.7978	138.7	-	-
69	33	3995	Oct 21	22:10:18	15075	24684	N	-t	-1.4918	0.1351	-0.8936	106.6	-	-
70	34	4013	Nov 01	05:42:44	15326	24907	N	-t	-1.5375	0.0511	-0.9773	65.8	-	-

SAROS SERIES

179

Saros series 179 contains 73 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-34	2816 Sep 27 14:42:10	3150 10101	Nb t-	-1.5723	0.0135	-1.0670	36.2	-	-	-	-	-	-
02	-33	2834 Oct 08 21:43:36	3265 10324	N t-	-1.5145	0.1208	-0.9621	107.4	-	-	-	-	-	-
03	-32	2852 Oct 19 04:52:51	3383 10547	N t-	-1.4622	0.2179	-0.8674	143.0	-	-	-	-	-	-
04	-31	2870 Oct 30 12:12:36	3503 10770	N t-	-1.4177	0.3007	-0.7869	166.7	-	-	-	-	-	-
05	-30	2888 Nov 09 19:40:54	3625 10993	N t-	-1.3793	0.3722	-0.7175	184.1	-	-	-	-	-	-
06	-29	2906 Nov 22 03:18:35	3749 11216	N t-	-1.3479	0.4308	-0.6606	196.9	-	-	-	-	-	-
07	-28	2924 Dec 02 11:03:33	3875 11439	N t-	-1.3217	0.4795	-0.6132	206.6	-	-	-	-	-	-
08	-27	2942 Dec 13 18:56:57	4003 11662	N t-	-1.3016	0.5168	-0.5767	213.4	-	-	-	-	-	-
09	-26	2960 Dec 24 02:55:37	4133 11885	N t-	-1.2853	0.5468	-0.5469	218.6	-	-	-	-	-	-
10	-25	2979 Jan 04 10:59:07	4265 12108	N t-	-1.2722	0.5705	-0.5227	222.4	-	-	-	-	-	-
11	-24	2997 Jan 14 19:05:35	4399 12331	N t-	-1.2609	0.5907	-0.5013	225.4	-	-	-	-	-	-
12	-23	3015 Jan 27 03:14:44	4536 12554	N t-	-1.2509	0.6080	-0.4821	227.8	-	-	-	-	-	-
13	-22	3033 Feb 06 11:22:29	4674 12777	N t-	-1.2394	0.6279	-0.4595	230.5	-	-	-	-	-	-
14	-21	3051 Feb 17 19:29:07	4815 13000	N h-	-1.2263	0.6502	-0.4338	233.4	-	-	-	-	-	-
15	-20	3069 Feb 28 03:31:54	4957 13223	N h-	-1.2092	0.6795	-0.4005	237.2	-	-	-	-	-	-
16	-19	3087 Mar 11 11:31:47	5102 13446	N h-	-1.1889	0.7144	-0.3611	241.5	-	-	-	-	-	-
17	-18	3105 Mar 22 19:23:54	5249 13669	N h-	-1.1617	0.7619	-0.3085	247.4	-	-	-	-	-	-
18	-17	3123 Apr 03 03:11:38	5397 13892	N h-	-1.1301	0.8170	-0.2479	253.8	-	-	-	-	-	-
19	-16	3141 Apr 13 10:50:43	5548 14115	N h-	-1.0909	0.8861	-0.1731	261.4	-	-	-	-	-	-
20	-15	3159 Apr 24 18:24:29	5701 14338	N h-	-1.0465	0.9646	-0.0886	269.4	-	-	-	-	-	-
21	-14	3177 May 05 01:48:56	5856 14561	P h-	-0.9935	1.0587	0.0115	278.3	25.6	-	-	-	-	-

22	-13	3195	May 16	09:09:12	6013	14784	P	h-	-0.9362	1.1609	0.1197	287.0	81.0	-
23	-12	3213	May 26	16:21:46	6173	15007	P	h-	-0.8720	1.2758	0.2404	295.7	112.6	-
24	-11	3231	Jun 06	23:30:18	6334	15230	P	h-	-0.8034	1.3988	0.3691	304.0	136.4	-
25	-10	3249	Jun 17	06:33:36	6497	15453	P	h-	-0.7296	1.5315	0.5070	311.7	156.0	-
26	-09	3267	Jun 28	13:35:21	6662	15676	P	h-	-0.6536	1.6685	0.6489	318.6	172.0	-
27	-08	3285	Jul 08	20:34:45	6830	15899	P	h-	-0.5745	1.8115	0.7963	324.6	185.3	-
28	-07	3303	Jul 21	03:33:44	6999	16122	P	a-	-0.4940	1.9571	0.9459	329.6	196.1	-
29	-06	3321	Jul 31	10:34:10	7171	16345	T	a-	-0.4138	2.1025	1.0948	333.5	204.5	47.3
30	-05	3339	Aug 11	17:37:05	7345	16568	T	a-	-0.3348	2.2461	1.2413	336.4	210.9	71.7
31	-04	3357	Aug 22	00:43:39	7520	16791	T-	p-	-0.2576	2.3864	1.3841	338.3	215.5	85.8
32	-03	3375	Sep 02	07:54:59	7698	17014	T-	p-	-0.1835	2.5214	1.5211	339.3	218.5	94.3
33	-02	3393	Sep 12	15:12:57	7878	17237	T-	pp	-0.1138	2.6485	1.6497	339.5	220.0	99.2
34	-01	3411	Sep 24	22:37:54	8060	17460	T-	pp	-0.0494	2.7661	1.7684	339.0	220.5	101.4
35	00	3429	Oct 05	06:09:30	8244	17683	T+	pp	0.0103	2.8375	1.8405	338.0	220.1	101.7
36	01	3447	Oct 16	13:50:07	8430	17906	T+	pp	0.0633	2.7401	1.7435	336.7	219.0	100.5
37	02	3465	Oct 26	21:39:08	8618	18129	T+	pp	0.1101	2.6541	1.6576	335.1	217.5	98.3
38	03	3483	Nov 07	05:37:35	8809	18352	T+	pp	0.1496	2.5817	1.5853	333.4	215.7	95.6
39	04	3501	Nov 18	13:43:40	9001	18575	T+	-p	0.1834	2.5196	1.5232	331.7	213.9	92.5
40	05	3519	Nov 29	21:59:14	9195	18798	T+	-p	0.2099	2.4710	1.4747	330.1	212.2	89.7
41	06	3537	Dec 10	06:22:06	9392	19021	T+	-p	0.2311	2.4320	1.4358	328.5	210.7	87.0
42	07	3555	Dec 21	14:51:59	9590	19244	T+	-p	0.2471	2.4024	1.4067	327.2	209.3	84.8
43	08	3573	Dec 31	23:27:34	9791	19467	T+	-p	0.2590	2.3803	1.3852	325.9	208.2	83.0
44	09	3592	Jan 12	08:08:02	9994	19690	T+	-p	0.2675	2.3640	1.3701	324.7	207.3	81.7
45	10	3610	Jan 22	16:51:53	10198	19913	T	-p	0.2738	2.3519	1.3594	323.7	206.5	80.7
46	11	3628	Feb 03	01:36:39	10405	20136	T	-p	0.2800	2.3394	1.3489	322.6	205.8	79.7
47	12	3646	Feb 13	10:22:36	10614	20359	T	-p	0.2858	2.3276	1.3395	321.5	205.1	78.7
48	13	3664	Feb 24	19:06:48	10825	20582	T	-p	0.2937	2.3117	1.3264	320.3	204.4	77.5
49	14	3682	Mar 07	03:48:23	11038	20805	T	-p	0.3040	2.2910	1.3090	319.0	203.4	75.8

50	15	3700	Mar 18	12:25:07	11253	21028	T	-p	0.3188	2.2621	1.2837	317.5	202.2	73.2
51	16	3718	Mar 29	20:57:29	11470	21251	T	-p	0.3376	2.2257	1.2510	315.7	200.7	69.5
52	17	3736	Apr 09	05:23:50	11690	21474	T	-p	0.3620	2.1789	1.2084	313.7	198.7	64.2
53	18	3754	Apr 20	13:43:02	11911	21697	T	-p	0.3924	2.1209	1.1545	311.2	196.0	56.2
54	19	3772	Apr 30	21:55:36	12134	21920	T	-p	0.4287	2.0524	1.0900	308.4	192.6	43.7
55	20	3790	May 12	06:01:07	12360	22143	T	-a	0.4709	1.9730	1.0145	305.0	188.3	17.9
56	21	3808	May 23	14:00:01	12587	22366	P	-a	0.5190	1.8828	0.9281	300.9	182.7	-
57	22	3826	Jun 03	21:51:52	12817	22589	P	-a	0.5733	1.7814	0.8301	296.0	175.6	-
58	23	3844	Jun 14	05:38:46	13049	22812	P	-a	0.6320	1.6721	0.7238	290.4	166.8	-
59	24	3862	Jun 25	13:20:32	13282	23035	P	-a	0.6949	1.5554	0.6097	283.7	155.9	-
60	25	3880	Jul 05	20:58:00	13518	23258	P	-a	0.7618	1.4317	0.4880	276.0	142.1	-
61	26	3898	Jul 17	04:32:33	13756	23481	P	-a	0.8311	1.3038	0.3616	267.2	124.6	-
62	27	3916	Jul 28	12:04:55	13996	23704	P	-a	0.9023	1.1727	0.2314	257.0	101.5	-
63	28	3934	Aug 08	19:37:01	14238	23927	P	-a	0.9737	1.0415	0.1005	245.7	68.1	-
64	29	3952	Aug 19	03:07:54	14482	24150	N	-a	1.0460	0.9089	-0.0324	232.9	-	-
65	30	3970	Aug 30	10:41:35	14729	24373	N	-a	1.1157	0.7816	-0.1607	218.9	-	-
66	31	3988	Sep 09	18:16:27	14977	24596	N	-a	1.1843	0.6566	-0.2872	203.3	-	-
67	32	4006	Sep 21	01:55:55	15227	24819	N	-a	1.2488	0.5391	-0.4068	186.6	-	-
68	33	4024	Oct 01	09:38:24	15480	25042	N	-a	1.3107	0.4268	-0.5216	168.0	-	-
69	34	4042	Oct 12	17:27:31	15734	25265	N	-a	1.3670	0.3252	-0.6263	148.3	-	-
70	35	4060	Oct 23	01:21:25	15991	25488	N	-a	1.4190	0.2315	-0.7235	126.4	-	-
71	36	4078	Nov 03	09:21:57	16249	25711	N	-a	1.4655	0.1480	-0.8106	102.0	-	-
72	37	4096	Nov 13	17:28:56	16510	25934	N	-a	1.5067	0.0743	-0.8881	73.0	-	-
73	38	4114	Nov 26	01:43:41	16773	26157	Ne	-a	1.5418	0.0119	-0.9546	29.4	-	-

SAROS SERIES

180

Saros series 180 contains 71 lunar eclipses.

PHASE													DURATIONS	
SEQ.	REL.	CALENDAR	TD	ΔT	LUNA	ECL.	QSE	GAMMA	PEN.	UM.	PEN.	PAR.	TOTAL	
NUM.	NUM.	DATE	OF	s	NUM	TYPE			MAG.	MAG.	m	m	m	
GREATEST														
ECLIPSE														
01	-36	2827 Aug 28	01:05:38	3219	10236	Nb a-	1.5211	0.0524	-0.9188	62.9	-	-		
02	-35	2845 Sep 07	08:36:34	3336	10459	N a-	1.4529	0.1771	-0.7934	113.9	-	-		
03	-34	2863 Sep 18	16:14:38	3455	10682	N a-	1.3899	0.2926	-0.6776	144.5	-	-		
04	-33	2881 Sep 28	23:59:38	3576	10905	N a-	1.3318	0.3992	-0.5711	166.7	-	-		
05	-32	2899 Oct 10	07:53:10	3699	11128	N a-	1.2802	0.4941	-0.4766	183.4	-	-		
06	-31	2917 Oct 21	15:55:02	3825	11351	N a-	1.2349	0.5776	-0.3938	196.3	-	-		
07	-30	2935 Nov 02	00:04:20	3952	11574	N a-	1.1953	0.6506	-0.3215	206.5	-	-		
08	-29	2953 Nov 12	08:22:40	4081	11797	N a-	1.1629	0.7106	-0.2625	214.1	-	-		
09	-28	2971 Nov 23	16:48:05	4213	12020	N a-	1.1363	0.7597	-0.2142	219.9	-	-		
10	-27	2989 Dec 04	01:21:19	4346	12243	N a-	1.1157	0.7979	-0.1767	224.2	-	-		
11	-26	3007 Dec 16	09:59:24	4482	12466	N a-	1.0991	0.8285	-0.1465	227.4	-	-		
12	-25	3025 Dec 26	18:43:57	4619	12689	N a-	1.0876	0.8498	-0.1255	229.5	-	-		
13	-24	3044 Jan 07	03:31:24	4759	12912	N a-	1.0785	0.8664	-0.1087	231.1	-	-		

14	-23	3062	Jan 17	12:21:56	4901	13135	N	a-	1.0719	0.8782	-0.0963	232.1	-	-
15	-22	3080	Jan 28	21:12:40	5045	13358	N	a-	1.0655	0.8894	-0.0840	233.0	-	-
16	-21	3098	Feb 08	06:03:34	5190	13581	N	a-	1.0591	0.9004	-0.0716	233.9	-	-
17	-20	3116	Feb 20	14:51:23	5338	13804	N	a-	1.0504	0.9155	-0.0547	235.2	-	-
18	-19	3134	Mar 02	23:36:02	5489	14027	N	a-	1.0390	0.9353	-0.0328	237.0	-	-
19	-18	3152	Mar 13	08:15:22	5641	14250	N	a-	1.0236	0.9624	-0.0032	239.5	-	-
20	-17	3170	Mar 24	16:50:03	5795	14473	P	a-	1.0045	0.9962	0.0331	242.6	39.4	-
21	-16	3188	Apr 04	01:16:17	5951	14696	P	a-	0.9785	1.0425	0.0822	246.8	61.7	-
22	-15	3206	Apr 15	09:36:39	6109	14919	P	a-	0.9477	1.0976	0.1400	251.5	79.9	-
23	-14	3224	Apr 25	17:48:14	6270	15142	P	a-	0.9099	1.1657	0.2108	257.1	97.1	-
24	-13	3242	May 07	01:54:13	6432	15365	P	a-	0.8676	1.2420	0.2896	263.1	112.6	-
25	-12	3260	May 17	09:50:31	6597	15588	P	a-	0.8174	1.3329	0.3827	269.7	127.7	-
26	-11	3278	May 28	17:42:21	6764	15811	P	a-	0.7636	1.4309	0.4825	276.3	141.4	-
27	-10	3296	Jun 08	01:26:16	6932	16034	P	a-	0.7029	1.5415	0.5945	283.1	154.3	-
28	-09	3314	Jun 20	09:06:38	7103	16257	P	a-	0.6395	1.6574	0.7113	289.6	165.8	-
29	-08	3332	Jun 30	16:40:18	7276	16480	P	a-	0.5705	1.7838	0.8380	296.0	176.4	-
30	-07	3350	Jul 12	00:12:40	7451	16703	P	a-	0.5006	1.9122	0.9662	301.7	185.5	-
31	-06	3368	Jul 22	07:41:23	7628	16926	T	a-	0.4275	2.0466	1.0997	307.0	193.4	46.0
32	-05	3386	Aug 02	15:09:33	7807	17149	T	p-	0.3542	2.1819	1.2335	311.6	199.9	67.7
33	-04	3404	Aug 13	22:37:05	7988	17372	T	p-	0.2807	2.3179	1.3674	315.5	205.1	81.2
34	-03	3422	Aug 25	06:06:28	8171	17595	T+	p-	0.2089	2.4509	1.4978	318.7	209.0	90.1
35	-02	3440	Sep 04	13:38:02	8357	17818	T+	pp	0.1396	2.5799	1.6235	321.3	211.8	95.7
36	-01	3458	Sep 15	21:12:14	8544	18041	T+	pp	0.0728	2.7042	1.7441	323.2	213.6	98.9
37	00	3476	Sep 26	04:51:09	8733	18264	T+	pp	0.0105	2.8207	1.8563	324.7	214.4	100.1
38	01	3494	Oct 07	12:34:58	8925	18487	T-	pp	-0.0473	2.7556	1.7866	325.7	214.6	99.6
39	02	3512	Oct 18	20:24:25	9118	18710	T-	p-	-0.0995	2.6622	1.6883	326.4	214.1	97.9
40	03	3530	Oct 30	04:20:13	9314	18933	T-	p-	-0.1460	2.5794	1.6004	326.9	213.2	95.3
41	04	3548	Nov 09	12:23:05	9512	19156	T-	p-	-0.1859	2.5089	1.5246	327.3	212.2	92.0

42	05	3566	Nov 20	20:32:58	9712	19379	T-	-p	-0.2195	2.4498	1.4603	327.6	211.1	88.6
43	06	3584	Dec 01	04:48:31	9913	19602	T-	-p	-0.2479	2.4004	1.4057	328.0	210.0	85.0
44	07	3602	Dec 12	13:10:50	10117	19825	T-	-p	-0.2701	2.3621	1.3625	328.6	209.1	81.8
45	08	3620	Dec 22	21:38:32	10323	20048	T	-p	-0.2870	2.3335	1.3292	329.2	208.4	79.0
46	09	3639	Jan 03	06:10:42	10531	20271	T	-p	-0.3000	2.3118	1.3032	330.0	208.0	76.7
47	10	3657	Jan 13	14:45:31	10742	20494	T	-p	-0.3102	2.2951	1.2826	330.8	207.7	74.7
48	11	3675	Jan 24	23:22:29	10954	20717	T	-p	-0.3180	2.2824	1.2666	331.7	207.6	73.1
49	12	3693	Feb 04	08:00:05	11168	20940	T	-p	-0.3246	2.2717	1.2530	332.6	207.5	71.7
50	13	3711	Feb 16	16:35:29	11384	21163	T	-p	-0.3324	2.2587	1.2377	333.3	207.4	70.0
51	14	3729	Feb 27	01:08:44	11603	21386	T	-p	-0.3413	2.2433	1.2204	334.0	207.2	68.0
52	15	3747	Mar 10	09:36:46	11823	21609	T	-p	-0.3539	2.2208	1.1966	334.5	206.8	64.9
53	16	3765	Mar 20	17:59:51	12046	21832	T	-a	-0.3698	2.1920	1.1668	334.7	206.0	60.5
54	17	3783	Apr 01	02:14:32	12271	22055	T	-a	-0.3921	2.1516	1.1257	334.6	204.5	53.4
55	18	3801	Apr 12	10:22:36	12497	22278	T	-a	-0.4190	2.1024	1.0761	334.0	202.5	42.3
56	19	3819	Apr 23	18:21:13	12726	22501	T	-a	-0.4530	2.0400	1.0135	332.8	199.5	18.2
57	20	3837	May 04	02:10:56	12957	22724	P	-a	-0.4938	1.9653	0.9386	331.0	195.2	-
58	21	3855	May 15	09:50:51	13190	22947	P	-a	-0.5421	1.8769	0.8499	328.3	189.3	-
59	22	3873	May 25	17:22:17	13425	23170	P	-a	-0.5966	1.7770	0.7496	324.6	181.5	-
60	23	3891	Jun 06	00:44:57	13662	23393	P	-h	-0.6576	1.6654	0.6375	319.7	171.1	-
61	24	3909	Jun 17	07:58:44	13901	23616	P	-h	-0.7250	1.5422	0.5134	313.3	157.1	-
62	25	3927	Jun 28	15:05:40	14143	23839	P	-t	-0.7972	1.4102	0.3802	305.3	138.4	-
63	26	3945	Jul 08	22:06:05	14386	24062	P	-t	-0.8742	1.2698	0.2382	295.4	112.3	-
64	27	3963	Jul 20	05:01:02	14631	24285	P	-t	-0.9543	1.1237	0.0902	283.4	70.8	-
65	28	3981	Jul 30	11:51:16	14879	24508	N	-t	-1.0373	0.9727	-0.0634	268.9	-	-
66	29	3999	Aug 10	18:39:11	15128	24731	N	-t	-1.1210	0.8206	-0.2182	251.8	-	-
67	30	4017	Aug 21	01:25:54	15380	24954	N	-t	-1.2047	0.6686	-0.3736	231.6	-	-
68	31	4035	Sep 01	08:11:28	15633	25177	N	-t	-1.2881	0.5175	-0.5284	207.5	-	-
69	32	4053	Sep 11	14:59:22	15889	25400	N	-t	-1.3685	0.3722	-0.6778	179.1	-	-

70 33 4071 Sep 22 21:49:20 16147 25623 N -t -1.4459 0.2323 -0.8220 143.8 - -

71 34 4089 Oct 03 04:44:40 16407 25846 N -t -1.5181 0.1021 -0.9569 96.8 - -